

Table of contents

Instructions: W0010043

Product: NF alternator
Part no.: 0 122 468 ..

Special features	I02/1
Structure, usage	I07/1
General information	I08/1
Safety measures	I10/1
Testers, equipment, tools	I12/1
Test specifications	I20/1
Tightening torques	I21/1 I22/1
Circuit diagram	I23/1
Alternator disassembly/testing table	I25/1
Component cleaning	II20/1 II22/1

Continue: I01/2

Table of contents

Alternator assembly table	III13/1
Editorial note	IV17/1

Continue: I01/1

SPECIAL FEATURES

These instructions describe repair work in conjunction with corresponding test specifications for the following alternators

0 122 468 ..
NF 14 V 90-150 A

Note:

These repair instructions were compiled on the basis of the alternator 0 122 468 015.

Various alternator versions can be found in the corresponding parts lists.

Continue: I02/2

SPECIAL FEATURES

Alternators of type NF are liquid-cooled and offer the following advantages:

- Optimum noise insulation
- Utilization of waste heat for faster warming of coolant
- Submersible
- Brushless design; therefore only wearing parts are deep-groove ball bearings

Continue: I03/1

SPECIAL FEATURES

To ensure proper functioning the alternator must be sealed following repair work and checked for leaks.

Continue: I03/2

SPECIAL FEATURES

General operating conditions

- The alternator pulley is not to be used as "carrying handle" (possibility of DE ball bearing damage).
- Alternator is not to be operated for more than 30 s without water cooling. 2 hours' cooling-down time must be allowed prior to renewed loading.
- Alternator is never to be operated without battery.

Continue: I04/1

SPECIAL FEATURES

Interference-suppression capacitor is always replaced as the cap into which it is integrated is always renewed.

Checking of the interference-suppression capacitor is thus not necessary.

Continue: I04/2

SPECIAL FEATURES

Explanation of labelling on alternator e.g.: NFB2 -> 14 V 90-150A

N = Size	G = 100 ... 109 mm
	K = 120 ... 129 mm
	N = 130 ... 142 mm

F = Liquid-cooled

B = Type Windingless rotor

2 = Size sub-division Di = 112 mm

Continue: I05/1

SPECIAL FEATURES

Explanation of labelling on alternator e.g.: NFB2 -> 14 V 90-150A

-> = Direction of rotation

->	Or R	=	Clockwise
<-	Or L	=	Counter-clockwise
<->	Or RL	=	Clockwise and counter-clockwise

14V = Alternator voltage in V

90- = Rated current in A measured at
n = 1800 min⁻¹

150A = Rated current in A measured at
n = 6000 min⁻¹

Continue: I05/2

SPECIAL FEATURES

Alternators of this type are equipped with a multi-function regulator.

Multi-function regulators feature the following:

- Voltage actual value and excitation current via connection B+
- Pre-excitation clocked via B+
- Connection/terminal L (recognition of ignition switch ON, fault display)
- Load response/starting (no supply of current during and immediately after starting; optional)

Continue: I06/1

SPECIAL FEATURES

- Load response/driving (power supply constantly increased via ramp; optional)
- Connection/DF monitor (evaluation of current alternator load; optional)
- Connection/terminal S (battery "Sense", voltage signal directly from battery; optional)
- Thermal regulation of regulator voltage (optional)

Continue: I01/1

STRUCTURE, USAGE

PC user prompting:

Position cursor on button and confirm.

Microcard user prompting:

User prompting is provided on every page e.g.:

- Continue: I 17/1

- Continue: II 18/1 Fig.: II 17/2

Brief instructions may include several rows of coordinates.

I../. = first coordinate row

II../. = second coordinate row

III../. = third coordinate row

etc.

.../1 = upper coordinate half

.../2 = lower coordinate half

Continue: I01/1

GENERAL

Expert repairs are only possible using the prescribed tools and measuring instruments, which are in perfect working order. We therefore recommend that exclusive use be made of the tools listed.

The use of incorrect and unsuitable tools and testers can lead to injury and may damage the product concerned or its component parts.

Continue: I08/2

GENERAL

Exclusive use is to be made of service parts as per applicable parts list for type of alternator concerned.

To ensure proper functioning, use must be made of the materials prescribed in these instructions.

Ensure absolute cleanliness when performing repair work.

Continue: I09/1

GENERAL

Tester and object being tested must be at room temperature for all checks performed during repair work.

The stated test values are referenced to a temperature of 20 C.

Continue: I01/1

SAFETY MEASURES

Alternator components may only be cleaned using compressed air (max. 4 bar) and a clean cloth.

Use is never to be made of liquid cleaning agents.

Continue: I10/2

SAFETY MEASURES

Always heed the following safety regulations:

- * German Order governing the use of flammable liquids (VbF).
 - * Accident prevention regulations for electrical systems and equipment.
 - * Safety regulations for the handling of chlorinated hydrocarbons:
 - For companies: ZH 1/222
 - For employees: ZH 1/129
- issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

Continue: I11/i

SAFETY MEASURES

Outside Germany, pay attention to appropriate local regulations.

Skin protection:

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

Continue: I01/1

TESTERS, FIXTURES, TOOLS

Interturn short circuit tester:	0 986 619 110
Test prods:	0 986 619 101
(old version:	0 986 619 114)
Alternator tester WPG 012.00:	0 684 201 200
Universal measuring instrument MMD 302:	0 684 500 302
or	
Electrical system tester:	0 684 101 400
	(ETE 014.00)

Continue: I12/2

TESTERS, FIXTURES, TOOLS

Magnetic meas. stand:	4 851 601 124
Dial gauge:	1 687 233 011
Scraper:	0 986 619 423
Test adapter:	0 986 619 419
Socket wrench for pulley:	0 986 618 152
	(KDLJ 6030)
Dismantling tool for over-running clutch pulley	0 986 619 396

Continue: I13/1

TESTERS, FIXTURES, TOOLS

Parting and extraction tool set, clamping range min. 60 mm:	comm. avail.
Torque wrench:	comm. avail.
Torx T20 bit socket:	comm. avail.
Torx T25 bit socket:	comm. avail.
Multi-point socket M10 Long version:	comm. avail.

Continue: I13/2

TESTERS, FIXTURES, TOOLS

Vacuum pump:	comm. avail.
V-blocks (2x):	comm. avail.
Mandrel press:	comm. avail.

Continue: I14/1

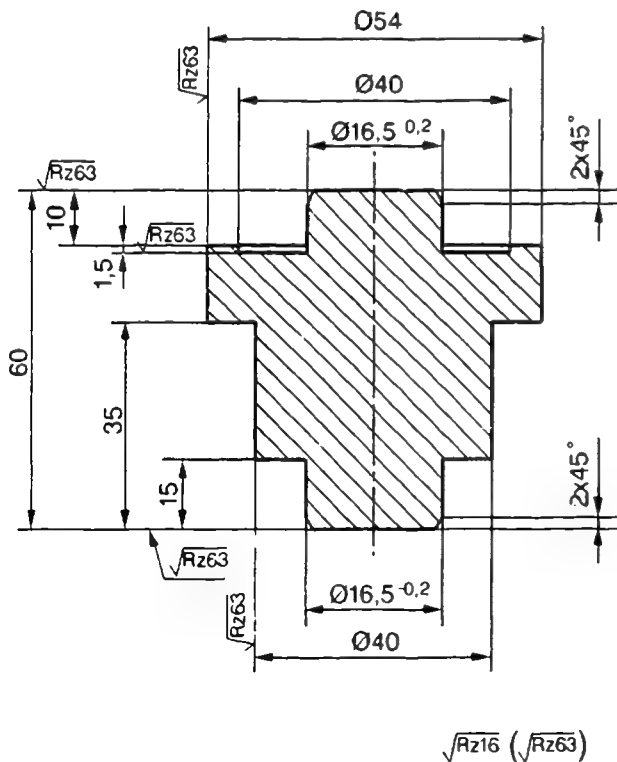
TESTERS, FIXTURES, TOOLS

Pressing-out/pressing-in
mandrel for DE deep-
groove ball bearings: To be improvised

Material: St

Continue: I15/1 Fig.: I14/2

KME00490



TESTERS, FIXTURES, TOOLS

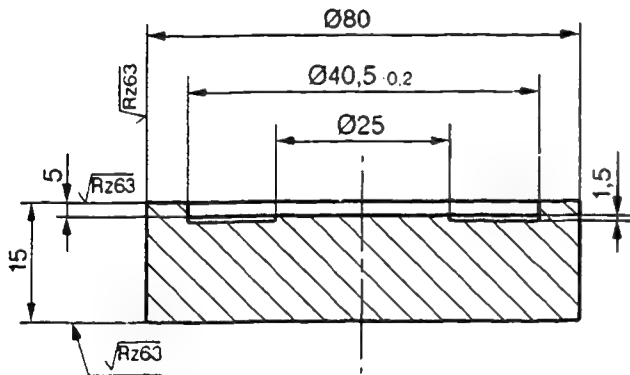
Pressing-on plate for
NDE deep-groove
ball bearings:

To be improvised

Material: St

Continue: I16/1 Fig.: I15/2

KME00491



$\sqrt{Rz16} (\sqrt{Rz63})$

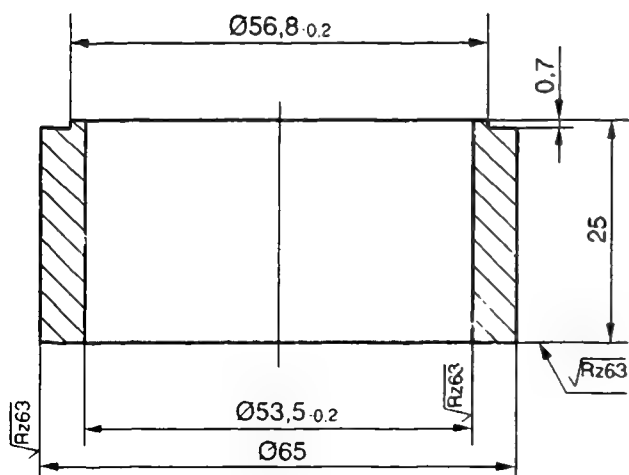
TESTERS, FIXTURES, TOOLS

Support sleeve for
dismantling DE deep-groove
ball bearings: To be improvised

Material: St

Continue: I17/1 Fig.: I16/2

KME00492



$\sqrt{Rz16}$ ($\sqrt{Rz63}$)

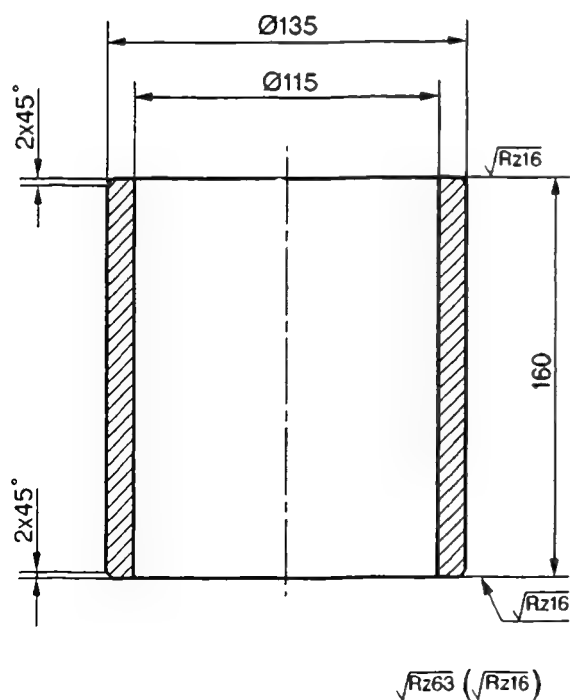
TESTERS, FIXTURES, TOOLS

Tubular support for
dismantling windingless
rotor: To be improvised

Material: St

Continue: I18/1 Fig.: I17/2

KME00548



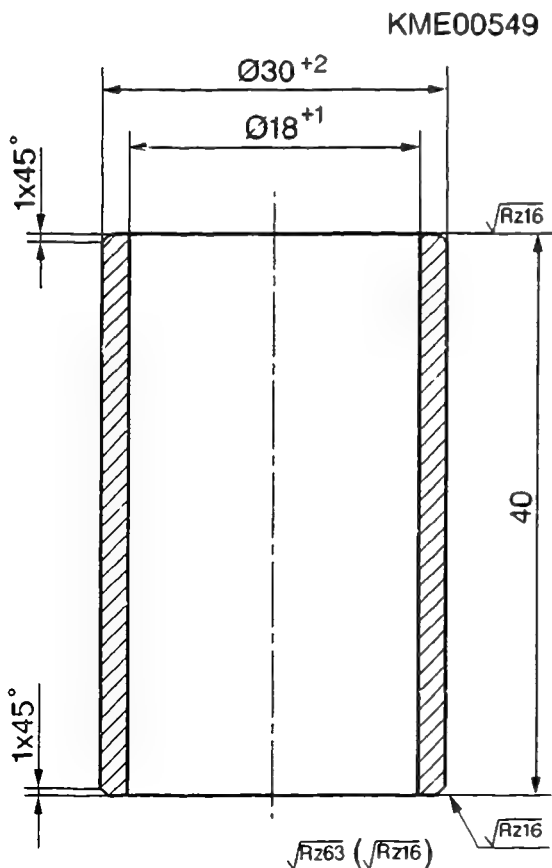
TESTERS, FIXTURES, TOOLS

Pressing-on sleeve for
assembling drive-end
shield:

To be improvised

Material: St

Continue: I19/1 Fig.: I18/2



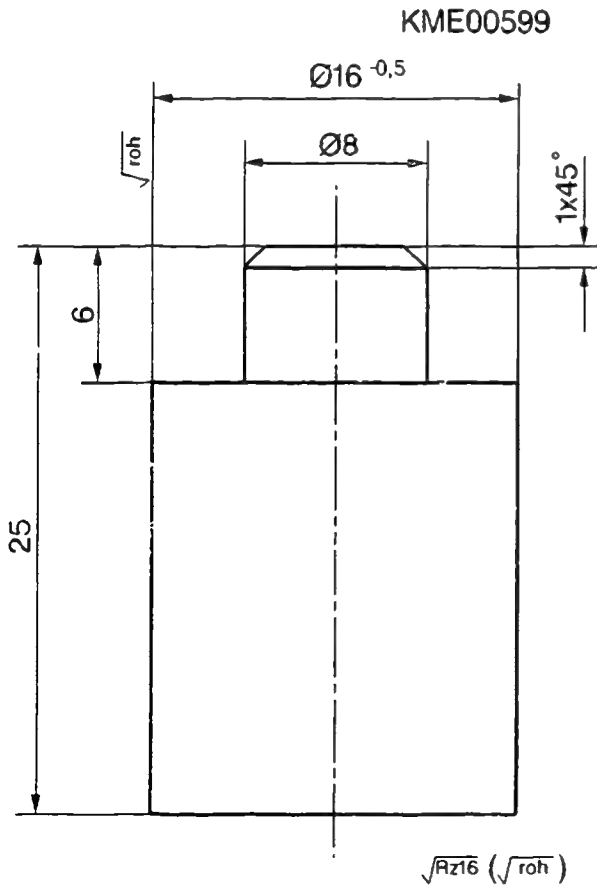
TESTERS, FIXTURES, TOOLS

Pressing-out mandrel for
dismantling winding-
less rotor:

To be improvised

Material: St

Continue: I01/1 Fig.: I19/2



TEST SPECIFICATIONS

Stator resistance

- Per phase: 0,03...0,04 Ohm
- Total resistance: 0,10...0,12 Ohm

Pole body resistance: 1,9...2,1 Ohm

Radial run-out at
OD of windingless
rotor:

< 0,025 mm

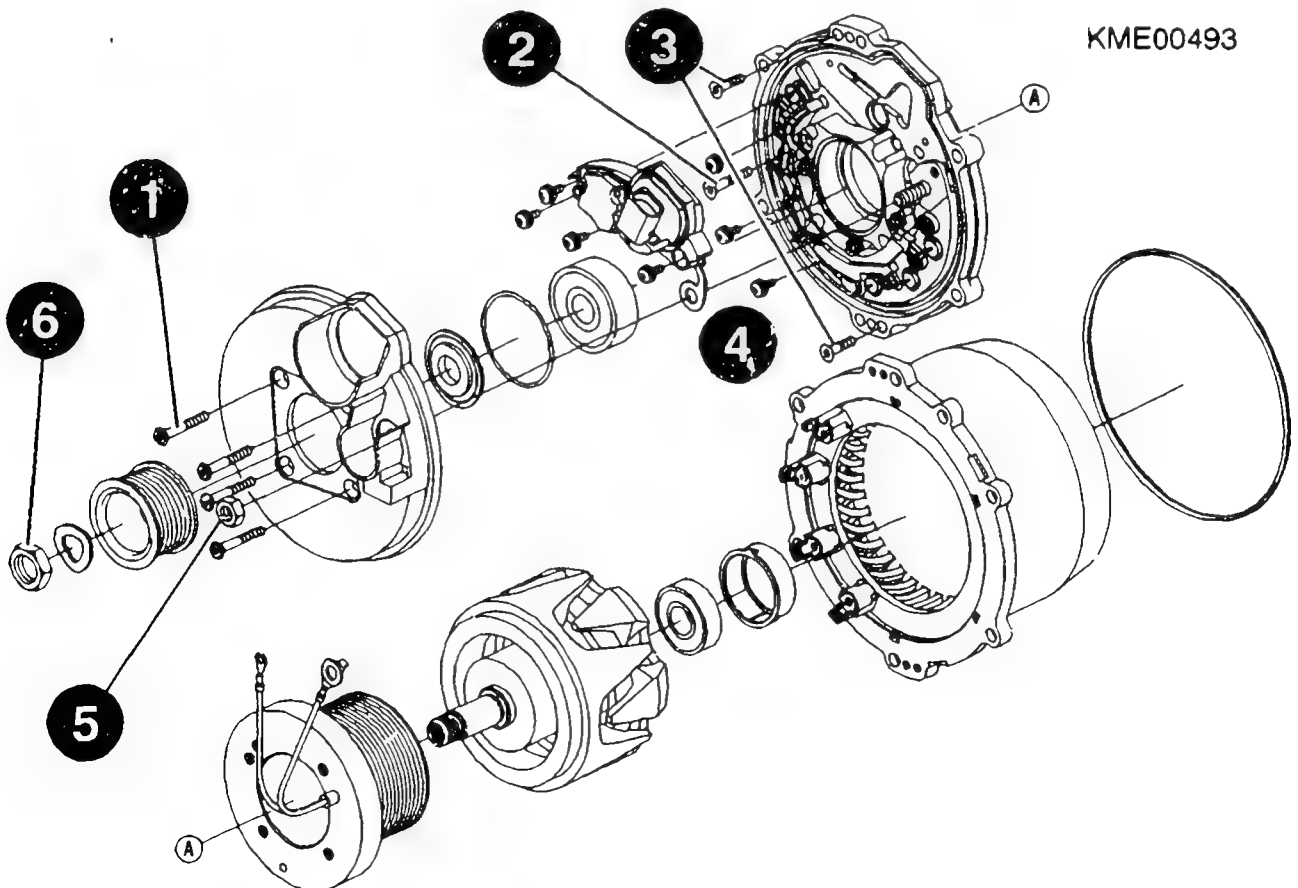
Continue: I01/1

TIGHTENING TORQUES

Tightening torques for:

1 = Ball-bearing retaining plate:	7,0...7,6	Nm
2 = Pole body:	5,2...5,8	Nm
3 = Alternator housing:	2,3...2,7	Nm
4 = Regulator, phase contacts, terminal V and DF connection:	1,0...1,4	Nm
5 = B+ nut:	18...22	Nm
6 = Pulley: Overrunning-clutch pulley:	60...70	Nm
Nut for B+ connecting cable:	10,1...13,5	Nm

Continue: I01/1 Fig.: I21/2



SEALANTS

General:

Alternator is to be kept free from grease and oil.

Thermal conduction paste

VS 11894-CH: 5 942 860 000

Adhesive

VS 18295-KK: 5 997 753 000

Continue: I01/1

CIRCUIT DIAGRAM

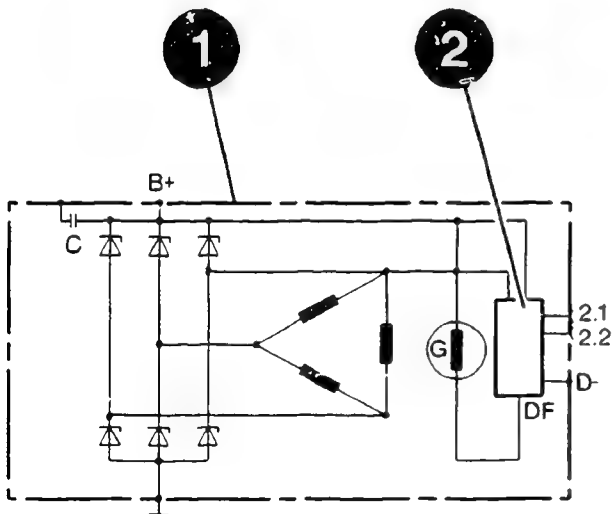
NOTE:

Pin assignment applies to alternators installed in BMW vehicles.

- 1 = Alternator
- 2 = Regulator
- 2.1 = Term. 15 (PIN 1)
- 2.2 = Term. L (PIN 2)

Continue: I24/1 Fig.: I23/2

KME00494



CIRCUIT DIAGRAM

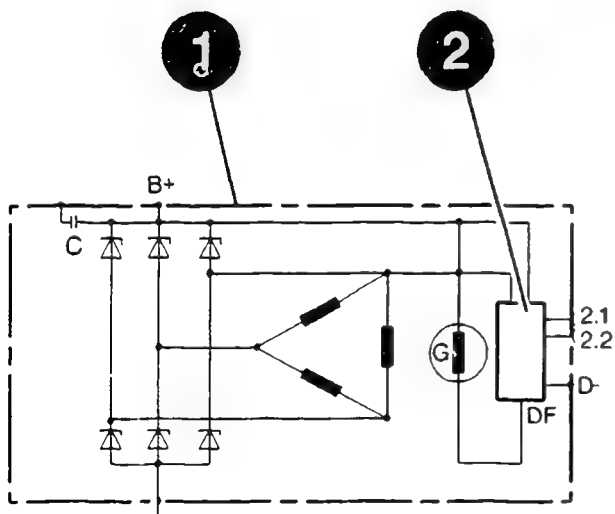
NOTE:

Pin assignment applies to alternators installed in MERCEDES-BENZ vehicles.

- 1 = Alternator
- 2 = Regulator
- 2.1 = Term. L (PIN 1)
- 2.2 = Term. DFM (PIN 2)

Continue: I01/1 Fig.: I24/2

KME00494



ALTERNATOR DISASSEMBLY TABLE

Dismantling pulley	I26/1
Dismantling cap	II01/1
Dismantling adhesive ring at regulator	II04/1
Dismantling regulator	II05/1
Checking (installed) rectifier	II08/1
Dismantling drive-end shield	II10/1
Dismantling windingless rotor	II14/1
Dismantling pole body	II18/1

Continue: I01/1

DISMANTLING AND CHECKING ALTERNATOR

Dismantling pulley

Place alternator on a clean flat surface (e.g. workbench).

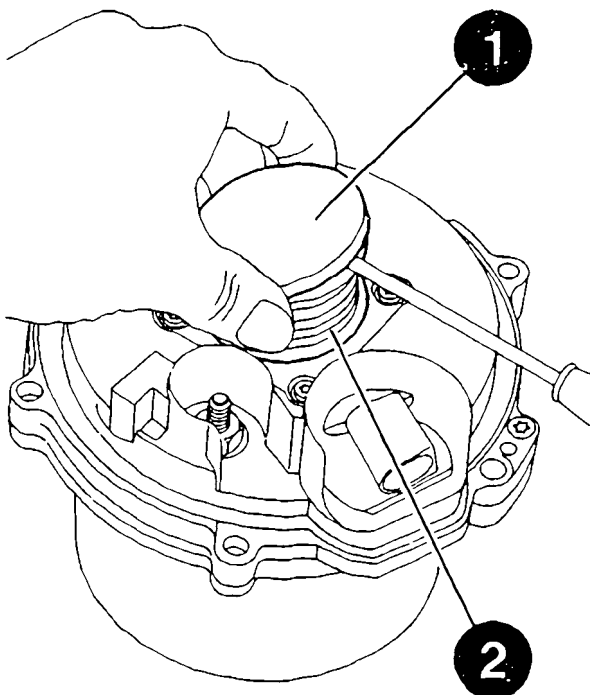
Remove cap (1) of pulley (2).

NOTE:

Cap is either inserted or clipped on. Inserted version can only be removed by piercing or prising out. Clipped-on version can be removed using a suitable tool.

Continue: I27/1 Fig.: I26/2

KME00495



DISMANTLING AND CHECKING ALTERNATOR

Dismantling pulley

Attach socket wrench (1) to nut of pulley (2).

Hold windingless rotor shaft of alternator with multi-point wrench (3) and slacken off nut using box wrench (22 mm). Detach pulley and spring lock washer.

Socket wrench:

0 986 618 152

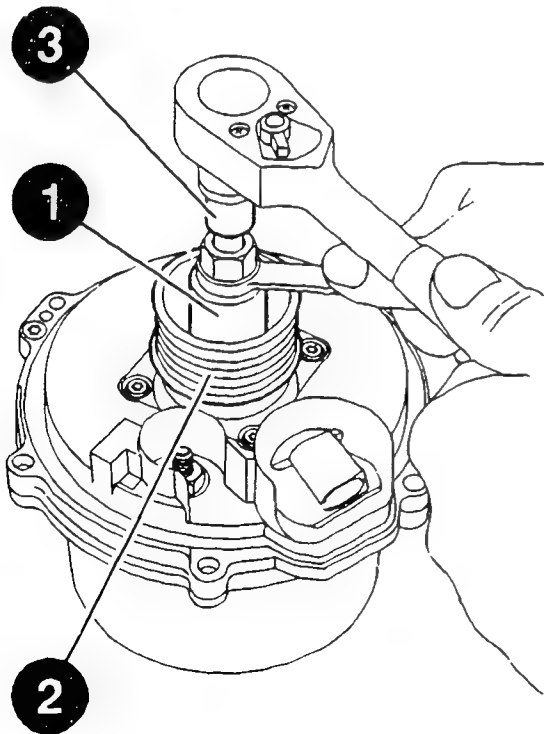
Multi-point socket M10

Long version:

comm. avail.

Continue: I28/1 Fig.: I27/2

KME00496



DISMANTLING AND CHECKING ALTERNATOR

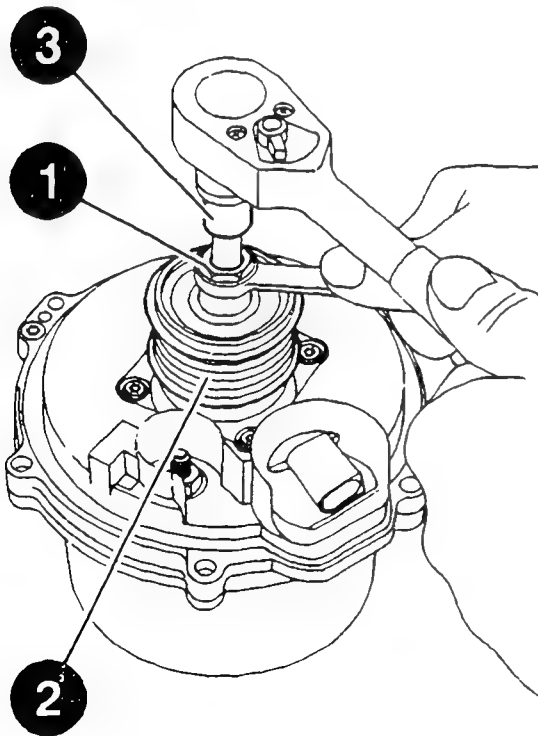
Dismantling pulley (overrunning-clutch pulley)

Insert dismantling tool (1) in grooved tothing of overrunning-clutch pulley (2). Hold windingless rotor shaft of alternator in position with multi-point wrench (3) and slacken off/detach overrunning-clutch pulley using box wrench (17 mm) and dismantling tool.

Dismantling tool:	0 986 619 396
Multi-point socket M10	
Long version:	comm. avail.

Continue: I25/1 Fig.: I28/2

KME00497



DISMANTLING AND CHECKING ALTERNATOR

Dismantling cap

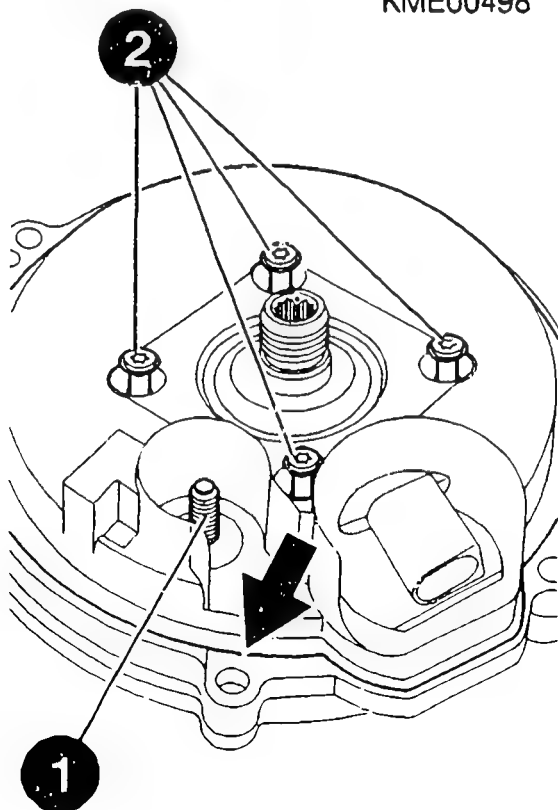
Use knife to cut through adhesive layer around periphery of cap (arrow).
Unfasten connection/terminal B+ (1) and bolts (2) of cap.

Torx T25:

comm. avail.

Continue: II02/1 Fig.: II01/2

KME00498



DISMANTLING AND CHECKING ALTERNATOR

Dismantling cap

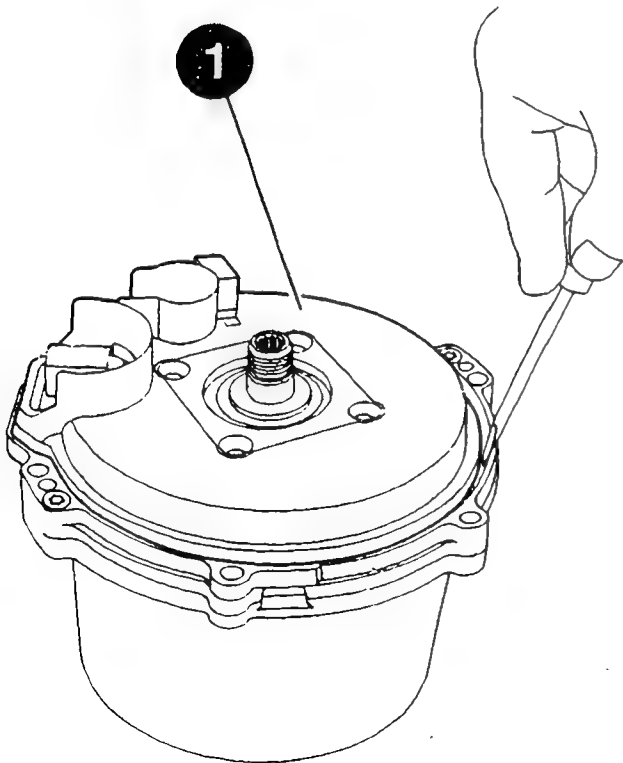
Detach cap (1).

NOTE:

If stiff, prise off cap by applying suitable tool opposite regulator connection. Cap and bolts are always to be replaced.

Continue: II03/1 Fig.: II02/2

KME00522



DISMANTLING AND CHECKING ALTERNATOR

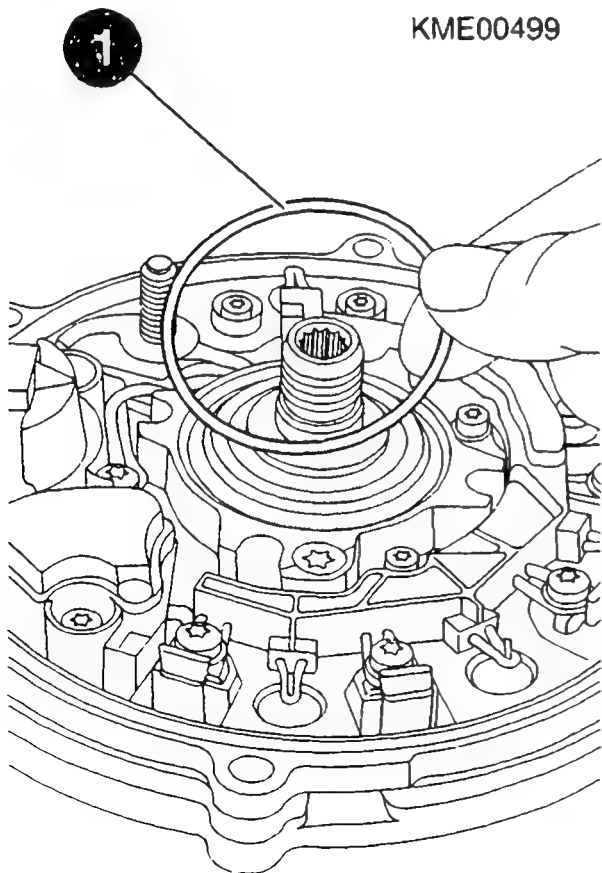
Dismantling cap

Take out O-ring (1).

NOTE:

O-ring is always to be replaced.

Continue: I25/1 Fig.: I103/2



DISMANTLING AND CHECKING ALTERNATOR

Dismantling adhesive ring at regulator

NOTE:

This work need not be performed if regulator is replaced.

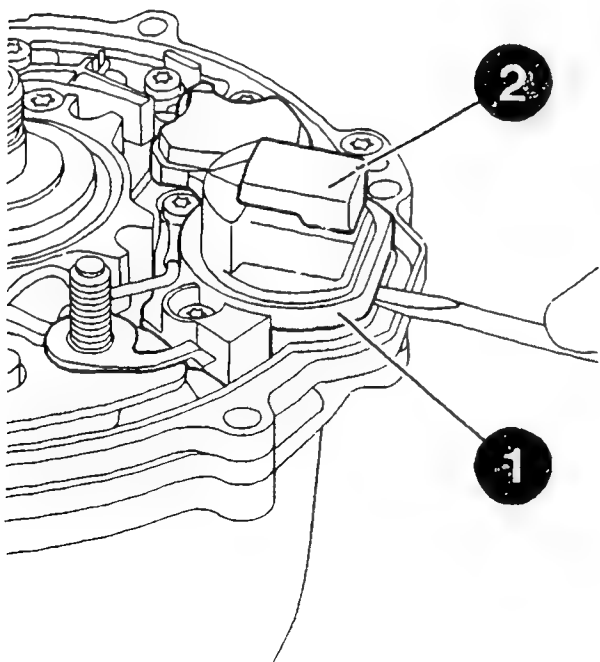
Carefully prise adhesive ring (1) off regulator (2) at straight edge (see Fig.).

ATTENTION:

Take care not to damage adhesive ring seat at regulator.

Continue: I25/1 Fig.: II04/2

KME00500



DISMANTLING AND CHECKING ALTERNATOR

Dismantling regulator

Unfasten DF connection (1).

Unfasten connection/terminal V (2).

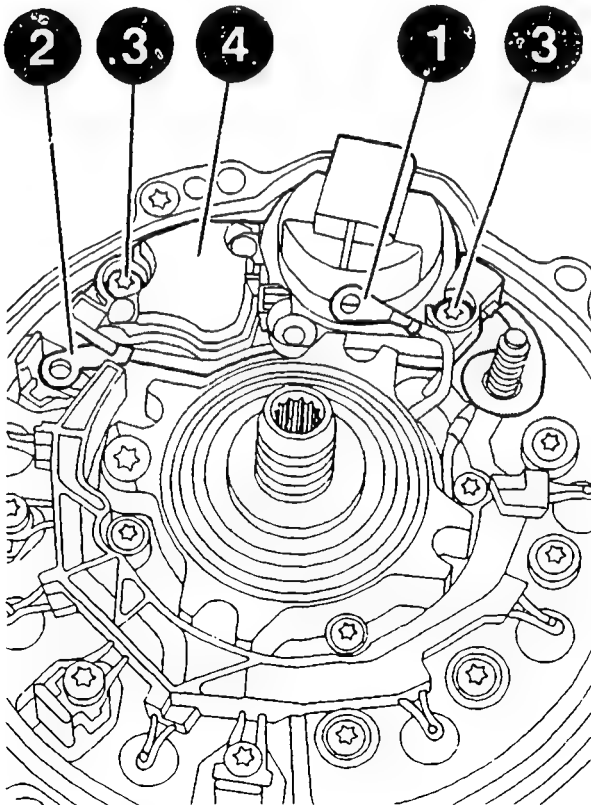
Slacken off bolts (3) of regulator (4).

TORX T20:

comm. avail.

Continue: II06/1 Fig.: II05/2

KME00501



DISMANTLING AND CHECKING ALTERNATOR

Dismantling regulator

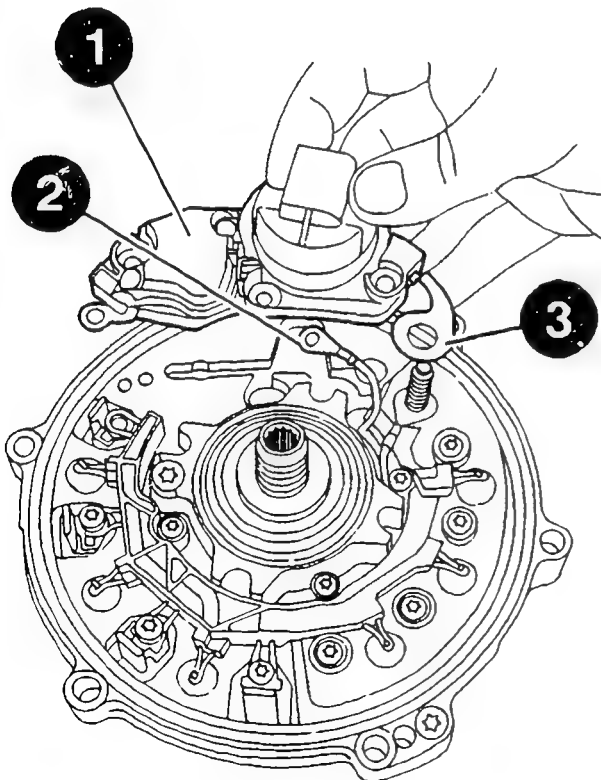
Detach regulator (1).

NOTE:

Pay attention to DF connection (2) and connection of terminal B+ (3).

Continue: II07/1 Fig.: II06/2

KME00502



DISMANTLING AND CHECKING ALTERNATOR

Dismantling regulator

NOTE:

This work need not be performed if regulator is replaced.

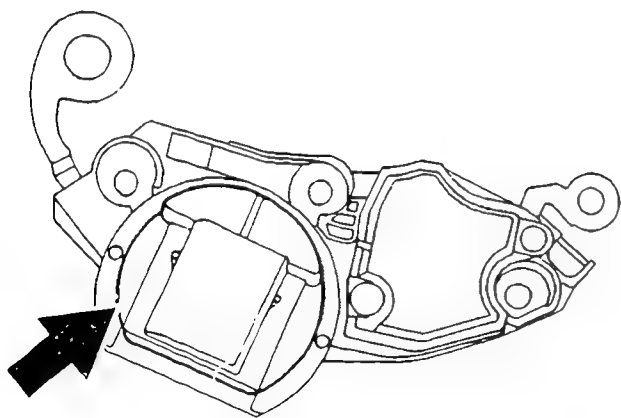
Carefully remove residual adhesive (arrow) at regulator and clean regulator with compressed air (max. 4 bar).

ATTENTION:

Take care not to damage regulator.

Continue: I25/1 Fig.: I107/2

KME00503



DISMANTLING AND CHECKING ALTERNATOR

Checking (installed) rectifier

GENERAL:

- * Pointer of measuring instrument must be in green band for this test.
- * Renew entire rectifier if one or more diodes defective.

Continue: II08/2

DISMANTLING AND CHECKING ALTERNATOR

- * To ensure proper functioning of rectifier, alternator is to be checked on test bench or diodes checked individually with rectifier removed.

Continue: II09/1

DISMANTLING AND CHECKING ALTERNATOR

Checking (installed) rectifier

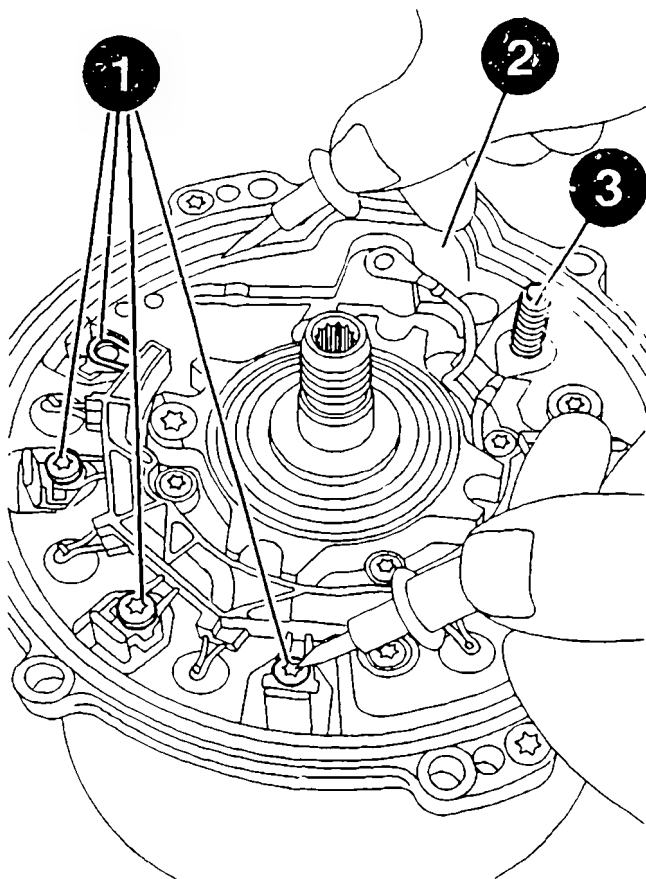
Check function of rectifier.
Pay attention to "COMBINED" switch
setting on tester.

Measurement points between:

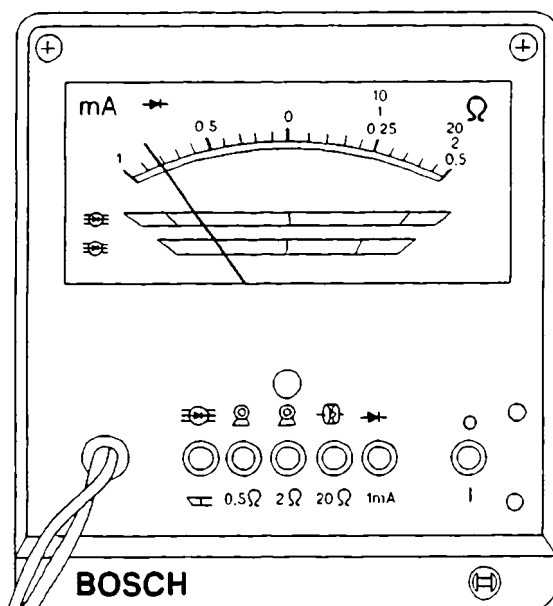
- * Phase contacts (1) and housing (2)
- * Phase contacts (1) and B+ (3)

Alternator tester: 0 684 201 200

Continue: I25/1 Fig.: II09/2



KME00504



DISMANTLING AND CHECKING ALTERNATOR

Dismantling drive-end shield

GENERAL:

- * Drive-end shield is dismantled complete with windingless rotor and pole body.
- * Drive-end shield and windingless rotor are connected by means of a transition fit.

ATTENTION: DANGER OF INJURY

When dismantling this assembly, make sure windingless rotor does not become inadvertently detached from drive-end shield.

Continue: I111/1

DISMANTLING AND CHECKING ALTERNATOR

Dismantling drive-end shield

Slacken off studs of phase contacts
(1).

Slacken off housing connecting bolts
(2).

TORX T20:

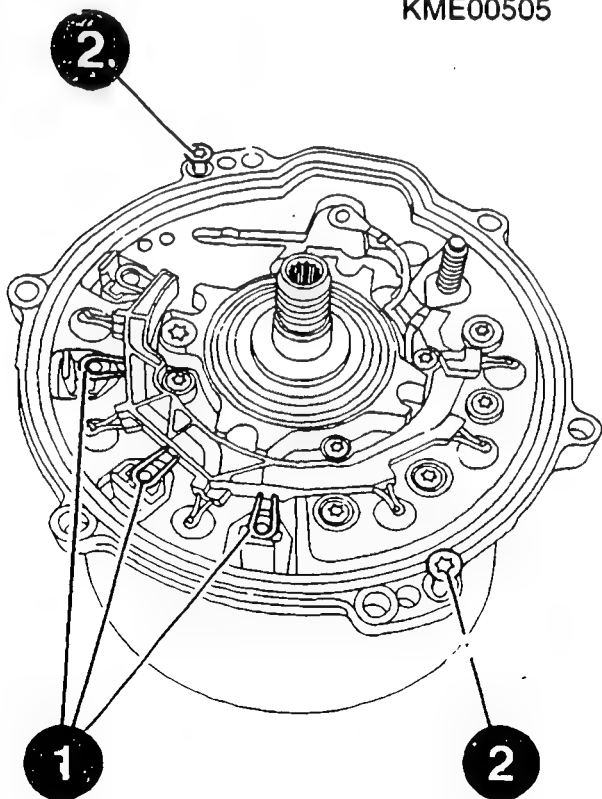
comm. avail.

TORX T25:

comm. avail.

Continue: II12/1 Fig.: II11/2

KME00505



DISMANTLING AND CHECKING ALTERNATOR

Dismantling drive-end shield

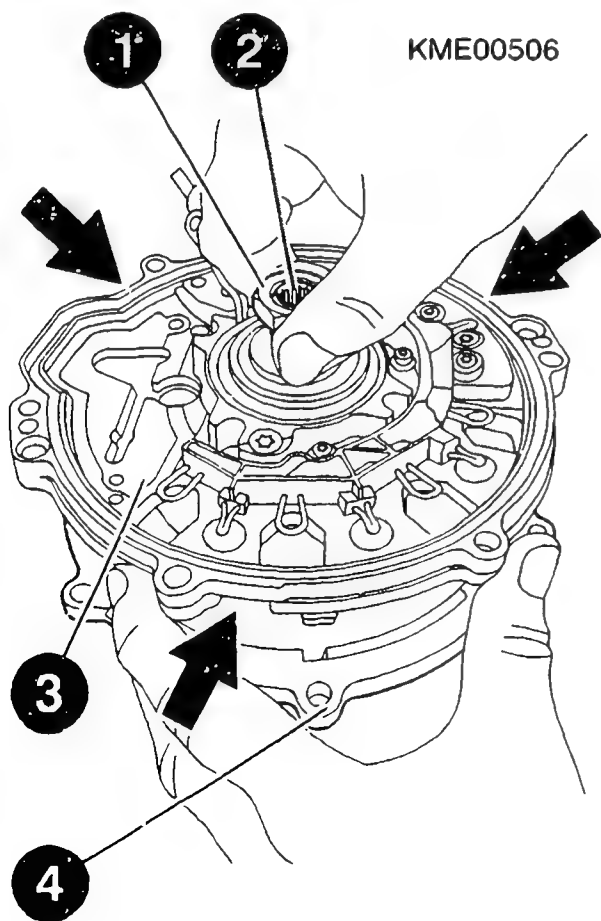
Unscrew nut (1) of pulley on rotor shaft (2).

Detach drive-end shield (3) from housing (4).

To do so, position suitable tool in 3 grooves (arrows) at periphery of drive-end shield and carefully prise off drive-end shield.

ATTENTION: Take care not to damage sealing surface at housing and drive-end shield.

Continue: II13/1 Fig.: II12/2



DISMANTLING AND CHECKING ALTERNATOR

Dismantling drive-end shield

Detach drive-end shield (3) complete with windingless rotor and pole body from housing (4).

ATTENTION:

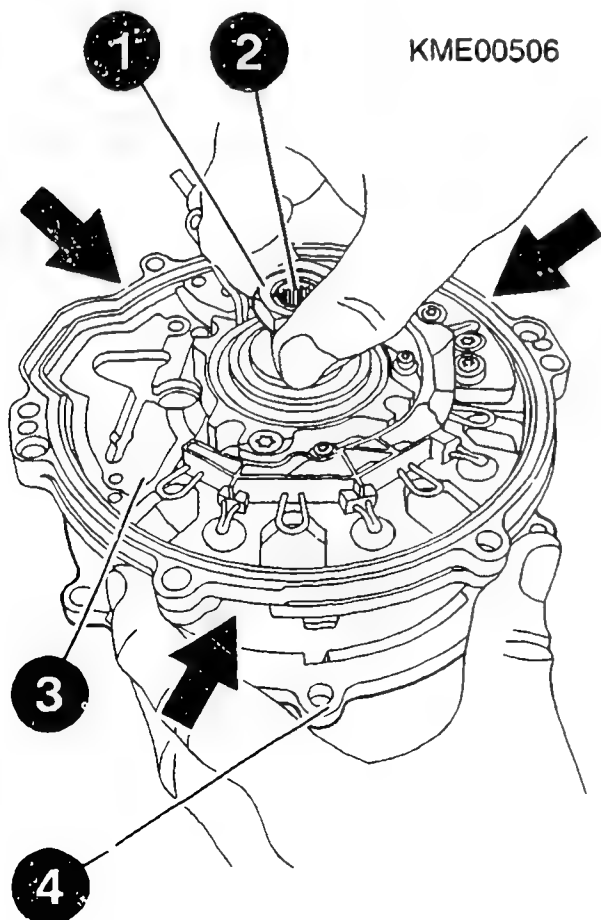
Take care not to damage stator.

Position assembly on a clean, flat surface.

ATTENTION: DANGER OF INJURY

Make sure windingless rotor does not become inadvertently detached from drive-end shield.

Continue: I25/1 Fig.: II13/2



DISMANTLING AND CHECKING ALTERNATOR

Dismantling windingless rotor

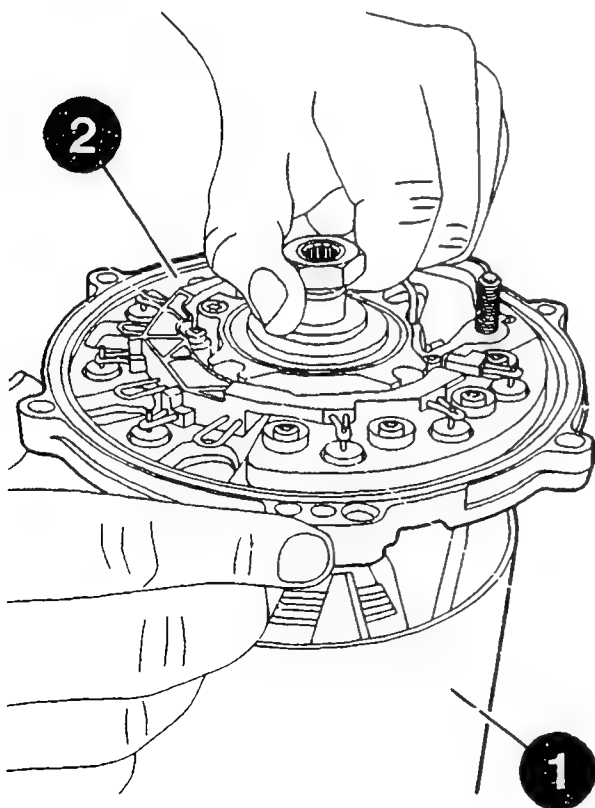
Position tubular dismantling tool (1) on mandrel press.

Insert suitable rest (wood, rubber or the like) into tool to stop windingless rotor banging against press table.

Mandrel press:	comm. avail.
Tubular dismantling tool:	to be improvised

Continue: II15/1 Fig.: II14/2

KME00507



DISMANTLING AND CHECKING ALTERNATOR

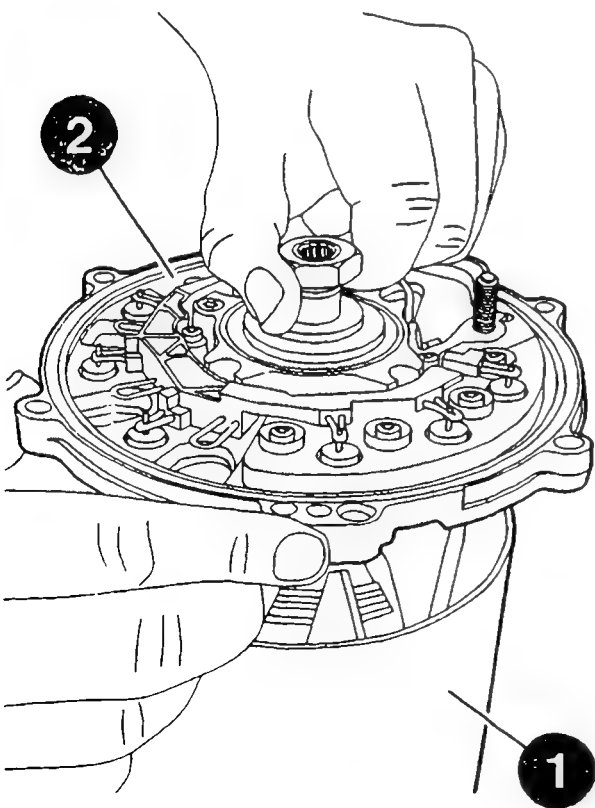
Dismantling windingless rotor

Position assembly (2) on tubular dismantling tool (1).

ATTENTION: DANGER OF INJURY
Make sure windingless rotor does not become inadvertently detached from drive-end shield.

Continue: II16/1 Fig.: II15/2

KME00507



DISMANTLING AND CHECKING ALTERNATOR

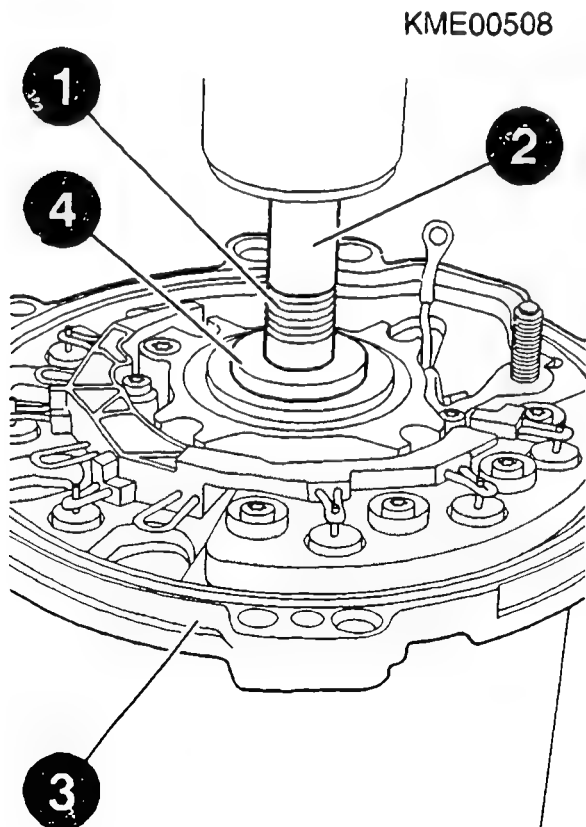
Dismantling windingless rotor

Screw nut of pulley off rotor shaft
(1).

Insert pressing-out mandrel (2) in
rotor shaft.

Pressing-out mandrel: to be improvised

Continue: II17/1 Fig.: II16/2



DISMANTLING AND CHECKING ALTERNATOR

Dismantling windingless rotor

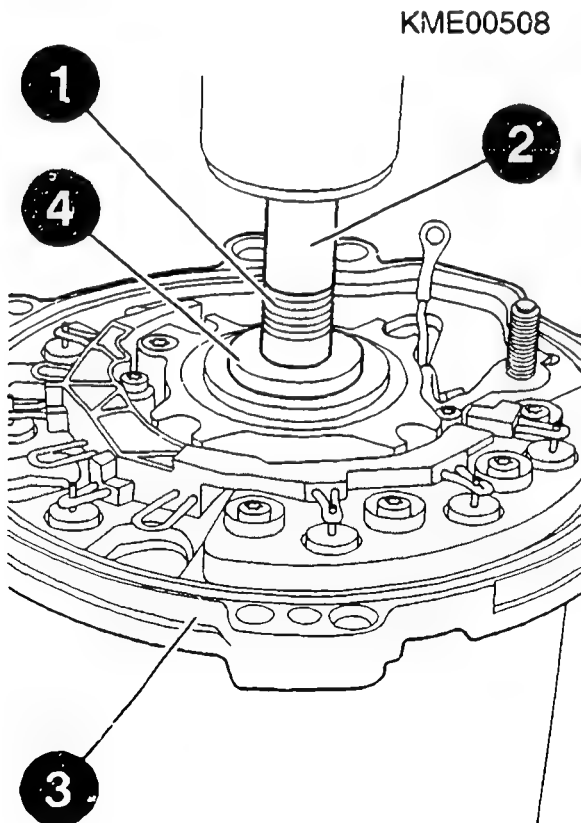
Press windingless rotor out of drive-end shield (3).

ATTENTION: Only increase pressure slowly so as to prevent permanent deformation of drive-end shield.

Detach pressing-out mandrel (2) and spacer (4).

Detach drive-end shield (3) with pole body and set down on a clean flat surface.

Continue: I25/1 Fig.: II17/2



DISMANTLING AND CHECKING ALTERNATOR

Dismantling pole body

Slacker off bolt (1) of pole body.

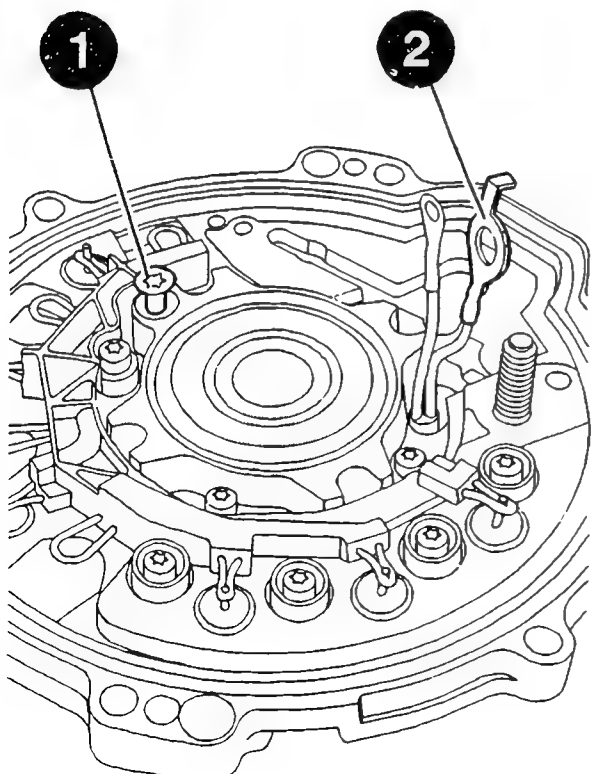
Detach connection/terminal B+ (2).

TORX T25:

comm. avail.

Continue: II19/1 Fig.: II18/2

KME00657



DISMANTLING AND CHECKING ALTERNATOR

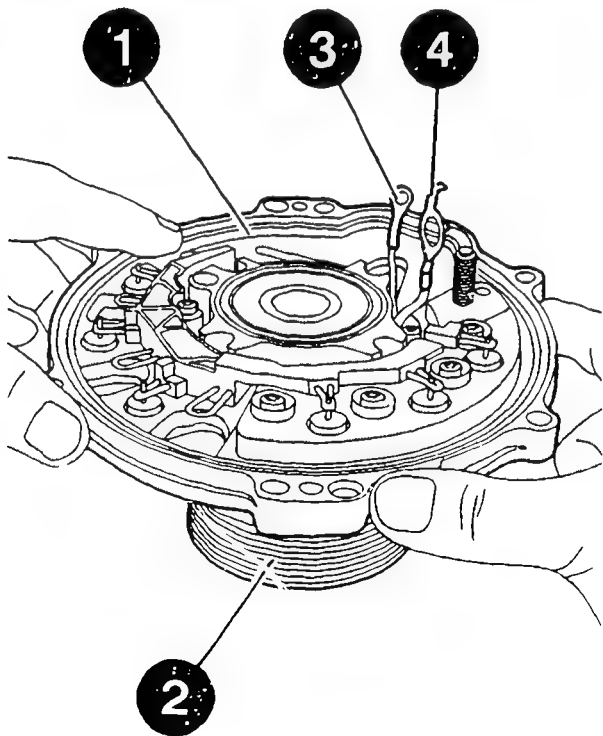
Dismantling pole body

Detach drive-end shield (1) from pole body (2).

Pay attention to connections (3) and (4).

Continue: I25/1 Fig.: II19/2

KME00658



COMPONENT CLEANING

Alternator components are only to be cleaned with compressed air (max. 4 bar) and a clean cloth. Use is never to be made of liquid cleaning agents.

Continue: II20/2

COMPONENT CLEANING

Always heed the following safety regulations:

- * German Order governing the use of flammable liquids (VbF).
 - * Accident prevention regulations for electrical systems and equipment.
 - * Safety regulations for the handling of chlorinated hydrocarbons:
 - For companies: ZH 1/222
 - For employees: ZH 1/129
- issued by the German industrial liability insurance associations (central association for accident prevention and industrial medicine), Langwartweg 103, 53129 Bonn.

Continue: II21/1

COMPONENT CLEANING

Outside Germany, pay attention to appropriate local regulations.

Skin protection:

To avoid skin irritation when handling oil and grease, apply hand cream before starting work and wash cream off when finished with soap and water.

Continue: I01/1

ALTERNATOR TEST TABLE

Checking (removed) rectifier	II23/1
Checking pole body (short to ground)	II25/1
Checking pole body (resistance)	II27/1
Checking stator winding (short to ground)	II28/1
Checking stator winding (resistance)	III02/1
Replacing fitting ring in NDE bearing seat	III03/1

Continue: II22/2

ALTERNATOR TEST TABLE

Replacing NDE bearing (dismantling)	III05/1
Checking windingless rotor (concentricity)	III06/1
Replacing NDE bearing (assembly)	III07/1
Checking drive-end shield	III08/1
Replacing DE bearing	III09/1

Continue: I01/1

CHECKING AND REPAIRING ALTERNATOR

Checking (removed) rectifier

GENERAL:

- * The diodes must be individually checked to ensure proper functioning of the rectifier.
- * The diodes are to be checked in forward and reverse direction.

Continue: II23/2

CHECKING AND REPAIRING ALTERNATOR

- * Pointer of measuring instrument must be in green band for checking in forward direction.
- * Pointer of measuring instrument must be in red band for checking in reverse direction.

Continue: II24/1

CHECKING AND REPAIRING ALTERNATOR

Checking (removed) rectifier

Heed general notes.

Check function of rectifier with alternator tester. Pay attention to "INDIVIDUAL CHECK" switch setting on tester.

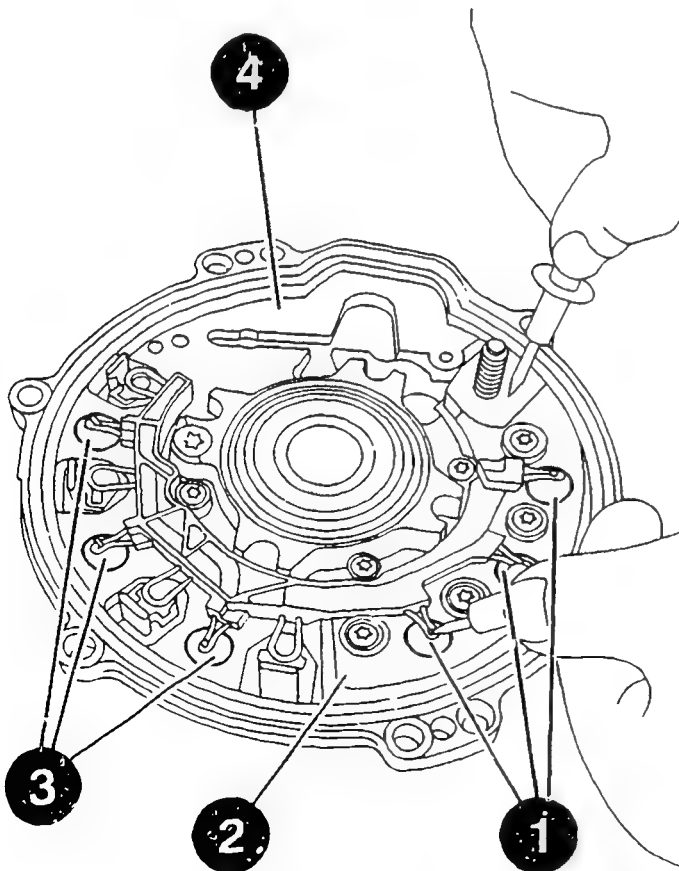
Measurement points between:

- * POSITIVE diodes (1) and POSITIVE plate (2)
- * NEGATIVE diodes (3) and end shield (4)

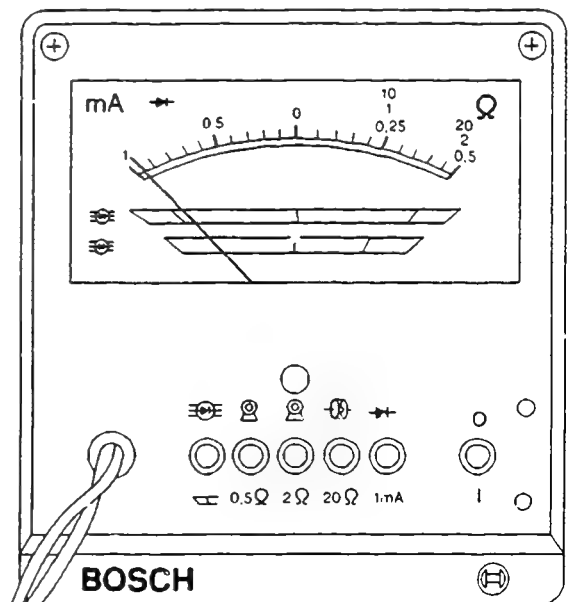
Alternator tester:

0 684 201 200

Continue: II22/1 Fig.: II24/2



KME00509



CHECKING AND REPAIRING ALTERNATOR

Checking pole body (short to ground)

ATTENTION:

Voltages of 80 V can cause
FATAL INJURY.

When performing this test, always
ensure correct handling of pole body
and all parts in electrical contact
with it.

Continue: II26/1

CHECKING AND REPAIRING ALTERNATOR

Checking pole body (short to ground)

Use interturn short-circuit tester and test prods to check pole body (1) between connecting cable (2) and iron core for short to ground.

Test voltage: 80 V AC

Interturn short-circuit
tester:

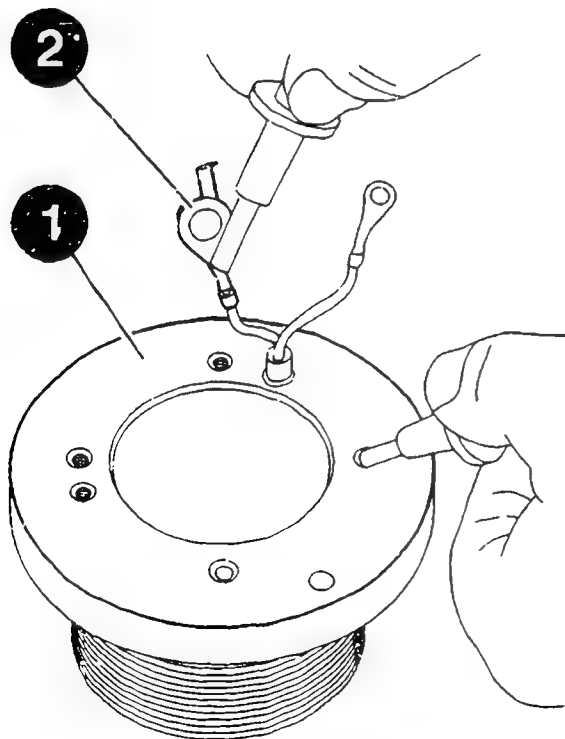
0 986 619 110

Test prods:

0 986 619 101

Continue: II22/1 Fig.: II26/2

KME00510



CHECKING AND REPAIRING ALTERNATOR

Checking pole body (resistance)

Use alternator tester to measure pole body resistance between connections (1) and (2).

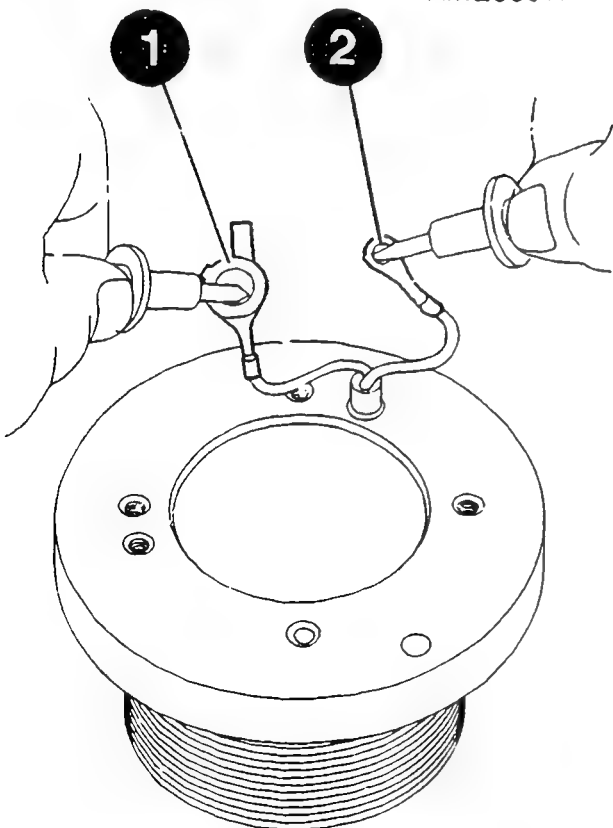
Pay attention to measuring range on measuring instrument.

Resistance value: 1,9...2,1 Ohm

Alternator tester: 0 684 201 200

Continue: II22/1 Fig.: II27/2

KME00511



CHECKING AND REPAIRING ALTERNATOR

Checking stator winding (short to ground)

ATTENTION:

Voltages of 80 V can cause
FATAL INJURY.

When performing this check, always ensure proper handling of alternator housing and all parts in electrical contact with it.

Continue: IIII01/1

CHECKING AND REPAIRING ALTERNATOR

Checking stator winding (short to ground)

Use interturn short-circuit tester and test prods to check stator winding (1) between one of the two outer phase contacts (2) and the alternator housing (3) for short to ground.

Test voltage: 80 V AC

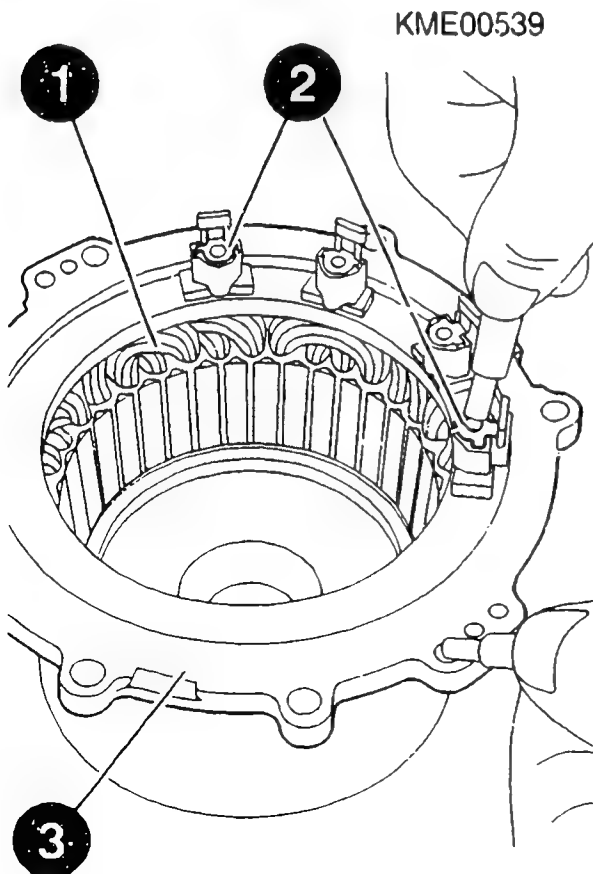
Interturn short-circuit tester:

0 986 619 110

Test prods:

0 986 619 101

Continue: II22/1 Fig.: III01/2



CHECKING AND REPAIRING ALTERNATOR

Checking stator winding (resistance)

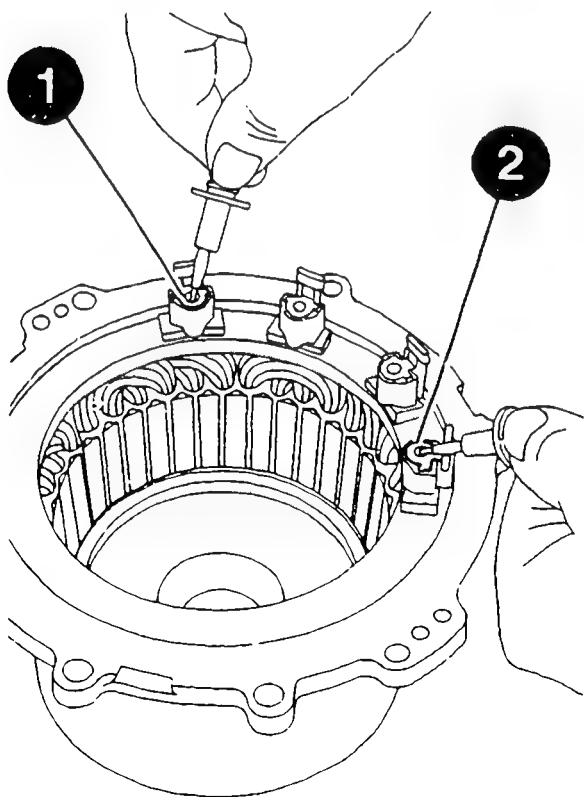
Use alternator tester to measure stator resistance between the two outer phase contacts (1) and (2). Pay attention to measuring range on measuring instrument.

Resistance value: 0,10...0,12 Ohm

Alternator tester: 0 684 201 200

Continue: II22/1 Fig.: III02/2

KME00547



CHECKING AND REPAIRING ALTERNATOR

Replacing fitting ring in NDE bearing seat

Dismantling:

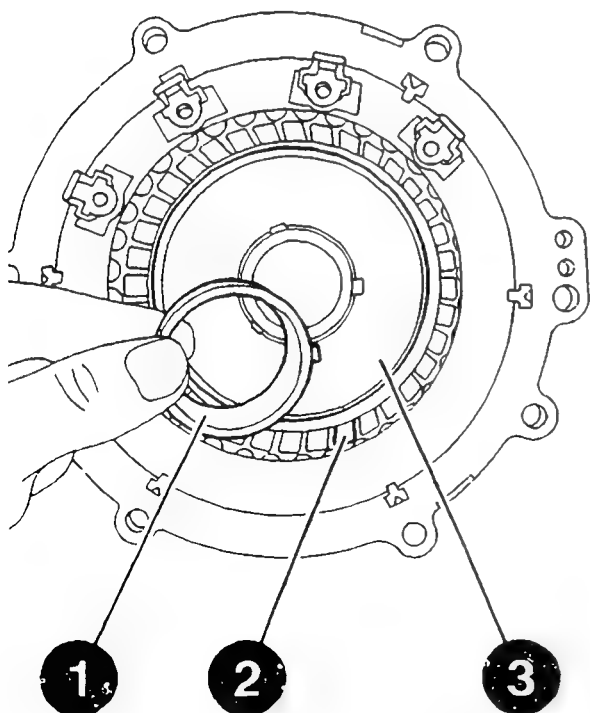
Use suitable tool to cut through fitting ring (1) in NDE bearing at groove and take out.

ATTENTION:

Take care not to damage stator winding (2) and bottom of housing (3).

Continue: III04/1 Fig.: III03/2

KME00512



CHECKING AND REPAIRING ALTERNATOR

Replacing fitting ring in NDE bearing seat

Assembly:

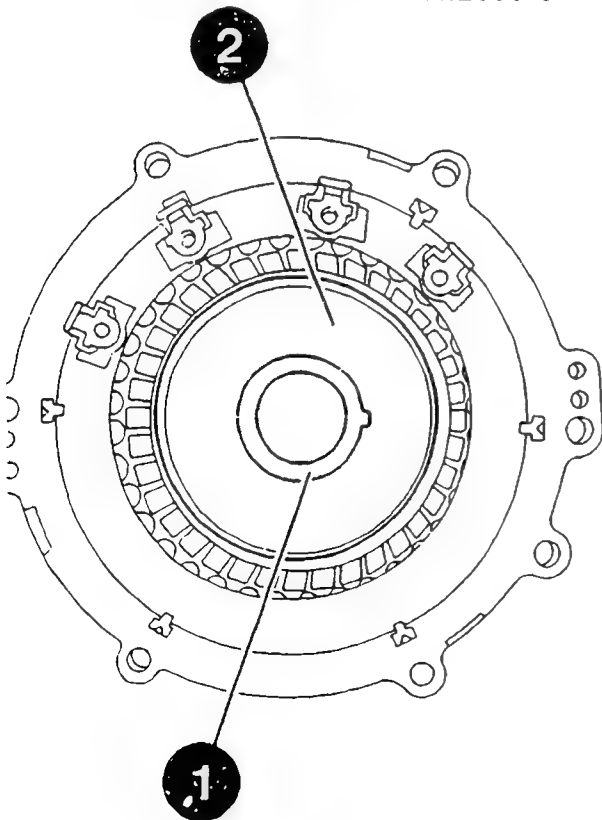
Insert new fitting ring (1) by hand in NDE bearing.

ATTENTION:

Ensure correct positioning of the 3 fitting ring lugs in the grooves in the bottom of the housing (2).

Continue: II22/1 Fig.: III04/2

KME00513



CHECKING AND REPAIRING ALTERNATOR

Replacing NDE bearing (dismantling)

Carefully clamp windingless rotor (1)
in vice between soft jaws.

ATTENTION:

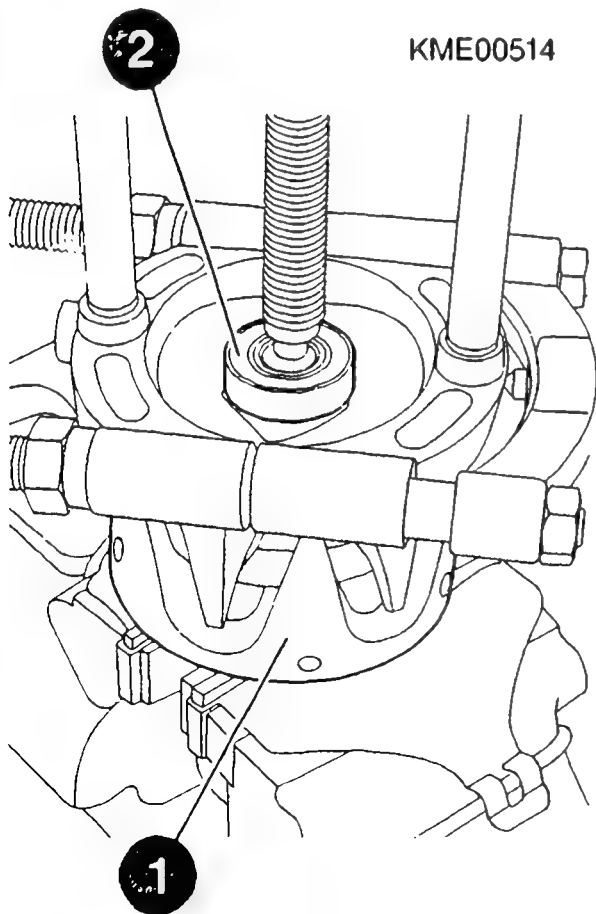
Clamp at shaft only.

Use extractor to pull deep-groove
ball bearing (2) off windingless
rotor.

Parting and
extracting tool:

comm. avail.

Continue: II22/2 Fig.: III05/2



CHECKING AND REPAIRING ALTERNATOR

Checking windingless rotor (concentricity)

Mount windingless rotor at supports
in V-blocks.

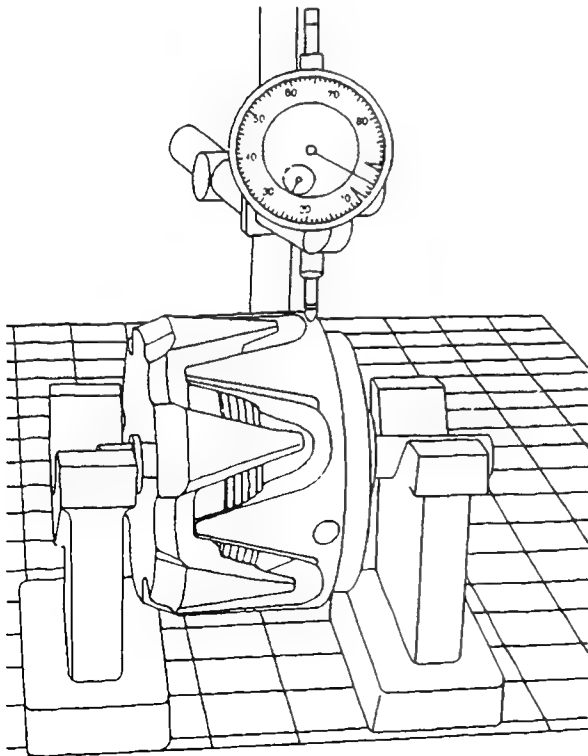
Perform concentricity measurement at
OD with magnetic measurement stand
and dial gauge.

Radial run-out: < 0,025 mm

Two V-blocks:	comm. avail.
Dial gauge:	1 687 233 011
Magnetic measurement stand:	4 851 601 124

Continue: II22/2 Fig.: III06/2

KME00515



CHECKING AND REPAIRING ALTERNATOR

Replacing NDE bearing (assembly)

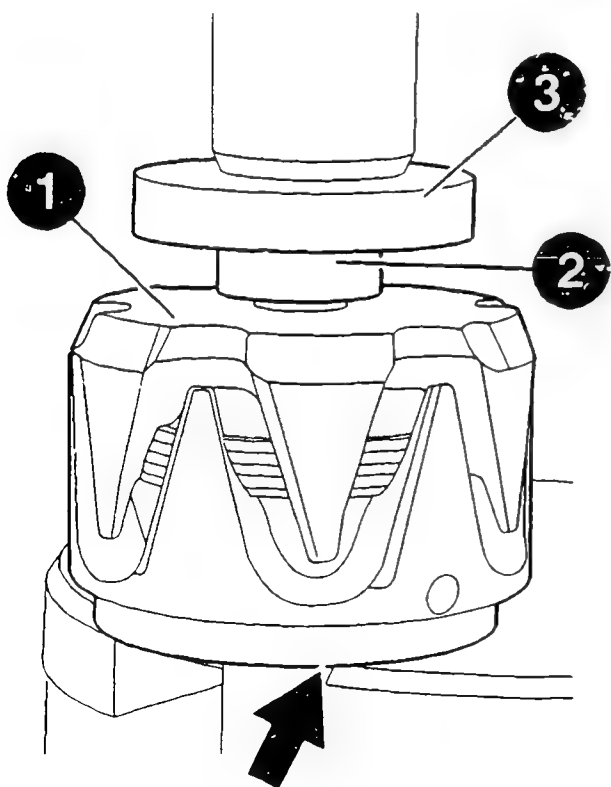
Place rotor body of windingless rotor (1) on mandrel press.

ATTENTION: OD (see arrow) of windingless rotor must not rest on press table. Press home new deep-groove ball bearing (2) with pressing-on plate (3) (flat surface upwards) on shaft of windingless rotor.

Mandrel press: comm. avail.
Pressing-on plate: to be improvised

Continue: II22/2 Fig.: III07/2

KME00516



CHECKING AND REPAIRING ALTERNATOR

Checking drive-end shield

Use scraper (2) to remove residual adhesive in groove (1).

Check groove for damage.

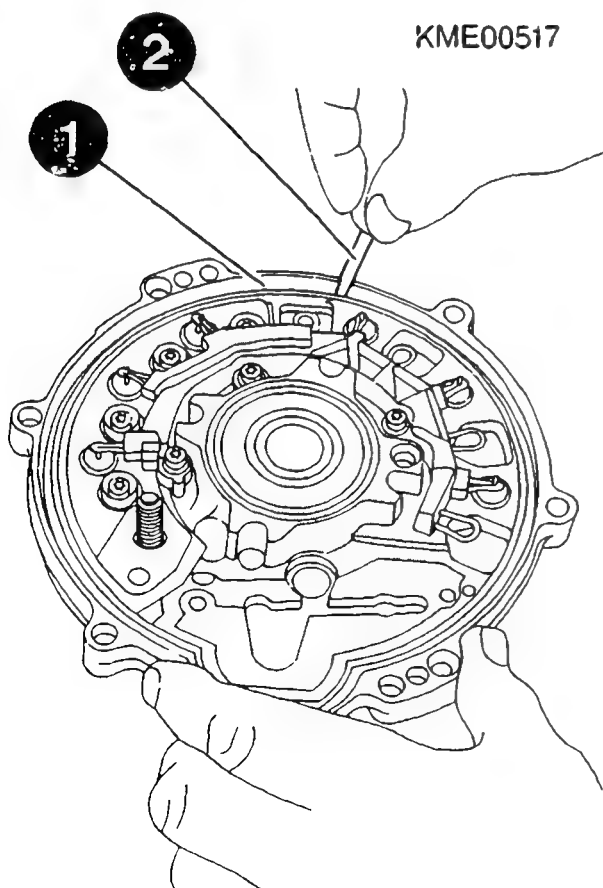
NOTE:

Make sure all residual adhesive in groove is removed.

Scraper:

0 986 619 423

Continue: II22/2 Fig.: III08/2



CHECKING AND REPAIRING ALTERNATOR

Replacing DE bearing

Dismantling:

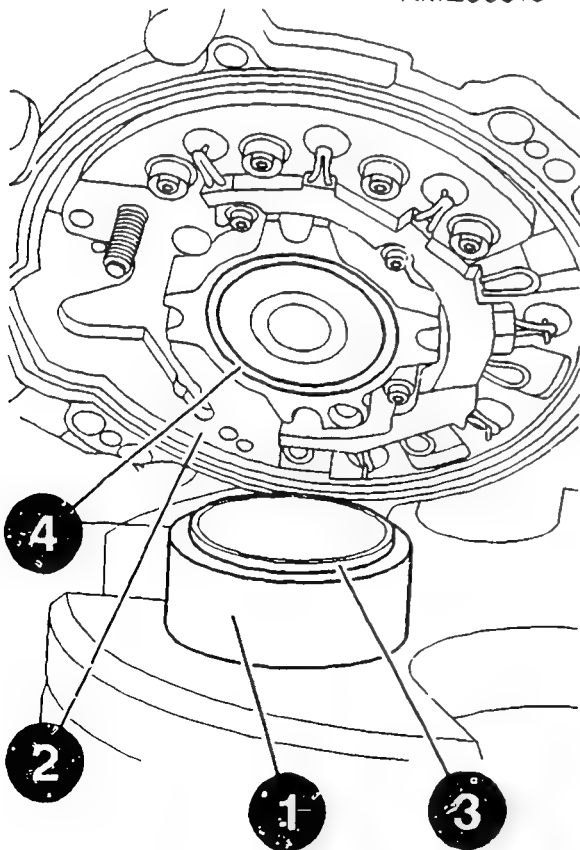
Position support sleeve (1) on mandrel press.

Place drive-end shield (2) on support sleeve (1) such that centering collar (3) of support sleeve is positioned in groove of O-ring (4) in drive-end shield.

Mandrel press: comm. avail.
Support sleeve: to be improvised

Continue: III10/1 Fig.: III09/2

KME00518



CHECKING AND REPAIRING ALTERNATOR

Replacing DE bearing

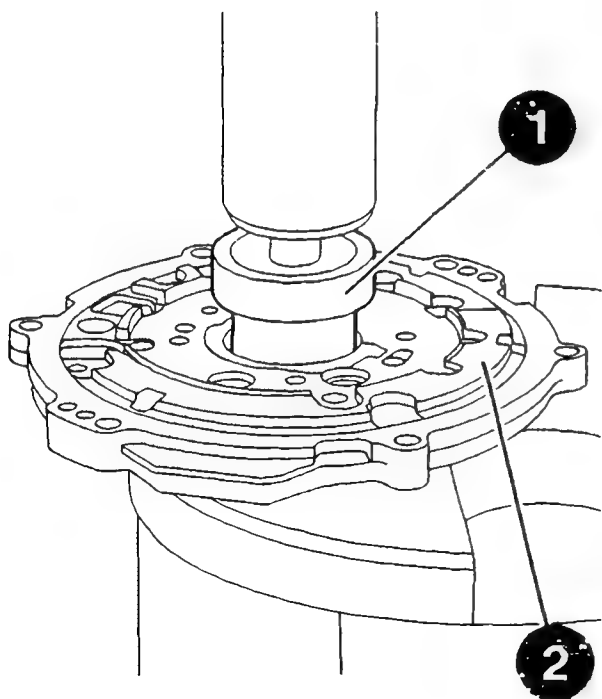
Dismantling continued:

Use pressing-out/pressing-in tool (1) to press deep-groove ball bearing out of drive-end shield (2).

Pressing-out/
pressing-in tool: to be improvised

Continue: III11/1 Fig.: III10/2

KME00519



CHECKING AND REPAIRING ALTERNATOR

Replacing DE bearing

Assembly:

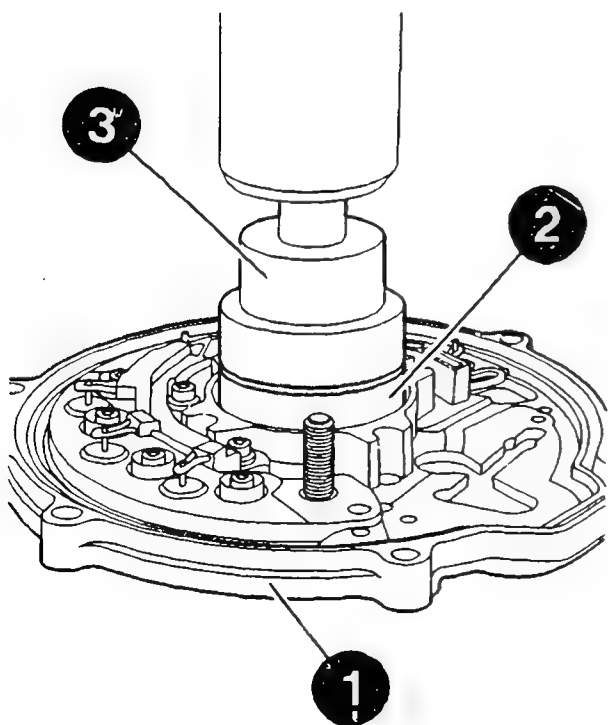
Position pressing-on plate (flat surface upwards) on mandrel press.

Place drive-end shield (1) on pressing-on plate such that terminal stud B+ is facing upwards.

Mandrel press: comm. avail.
Pressing-on plate: to be improvised

Continue: III12/1 Fig.: III11/2

KME00520



CHECKING AND REPAIRING ALTERNATOR

Replacing DE bearing

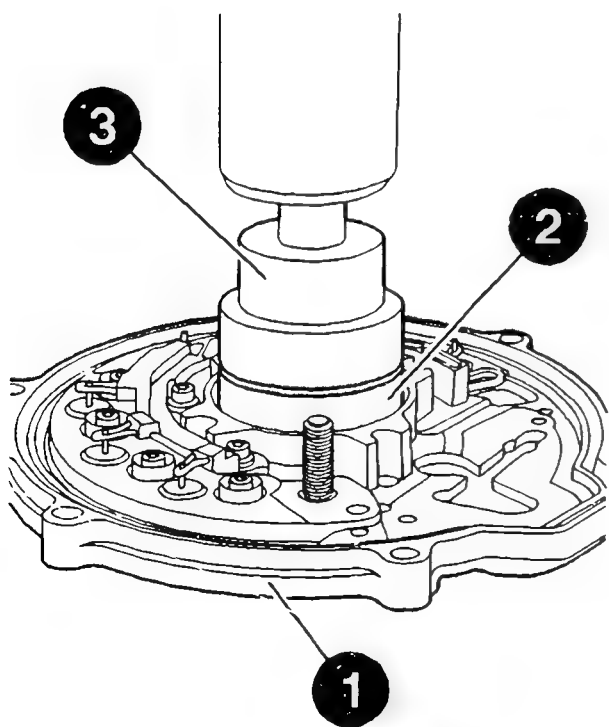
Assembly continued:

Insert new deep-groove ball bearing (2) in drive-end shield (1) and press home using pressing-out/pressing-in tool (3).

Pressing-out/
pressing-in tool: to be improvised

Continue: II22/2 Fig.: III12/2

KME00520



ALTERNATOR ASSEMBLY TABLE

Assembling pole body	III14/1
Assembling windingless rotor	III16/1
Assembling drive-end shield	III20/1
Assembling regulator	III23/1
Fitting adhesive ring at regulator	III27/1
Fitting cap	III28/1
Sealing alternator	IV03/1
Assembling pulley	IV05/1
Replacing sealing ring	IV08/1
Alternator leak test	IV09/1

Continue: I01/1

ASSEMBLING ALTERNATOR

Assembling pole body

Ensure absolute component cleanliness during assembly.

Use plastic spatula to apply thin coat of thermal conduction paste to contact surface (1) of drive-end shield on pole body (2).

ATTENTION:

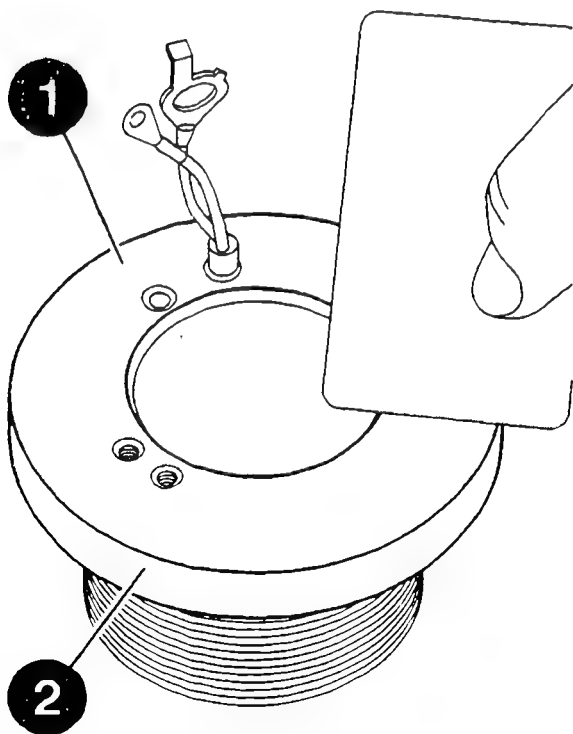
Thermal conduction paste must form a continuous layer.

Thermal conduction paste
VS 11894-CH:

5 942 860 000

Continue: III15/1 Fig.: III14/2

KME00523



ASSEMBLING ALTERNATOR

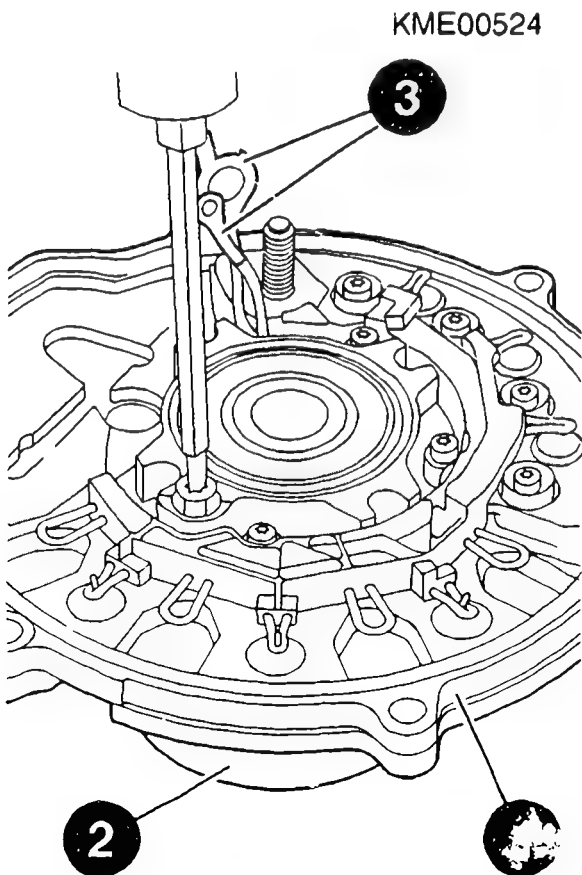
Assembling pole body

Position drive-end shield (1) on pole body (2) and secure. Ensure correct positioning of drive-end shield with respect to pole body. **ATTENTION:** Ensure proper penetration of connections (3) through drive-end shield. Use torque wrench.

Tightening torque: 5,2...5,8 Nm

Torque wrench: comm. avail.
TORX T25: comm. avail.

Continue: III13/1 Fig.: III15/2



ASSEMBLING ALTERNATOR

Assembling windingless rotor

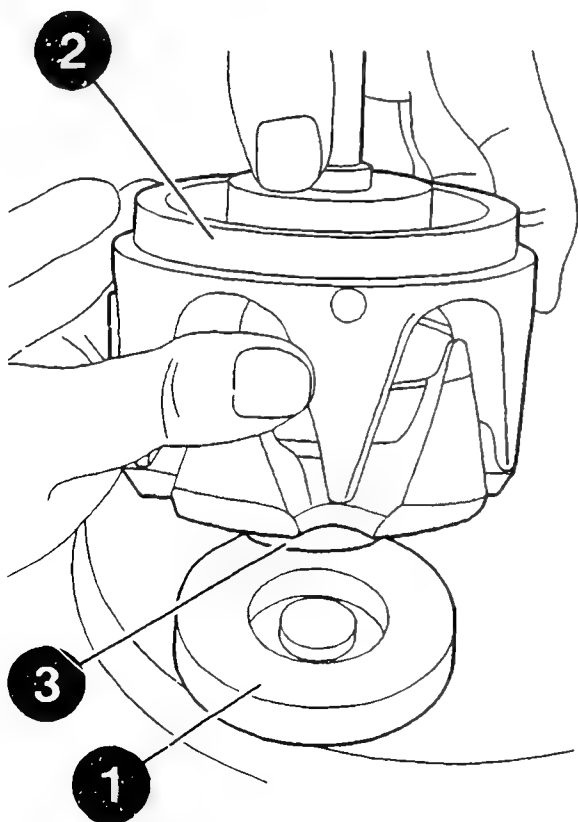
Position flat surface of pressing-on plate (1) on press table.

Place windingless rotor (2) with deep-groove ball bearing (3) in pressing-on plate.

Mandrel press: comm. avail.
Pressing-on plate: to be improvised

Continue: III17/1 Fig.: III16/2

KME00525



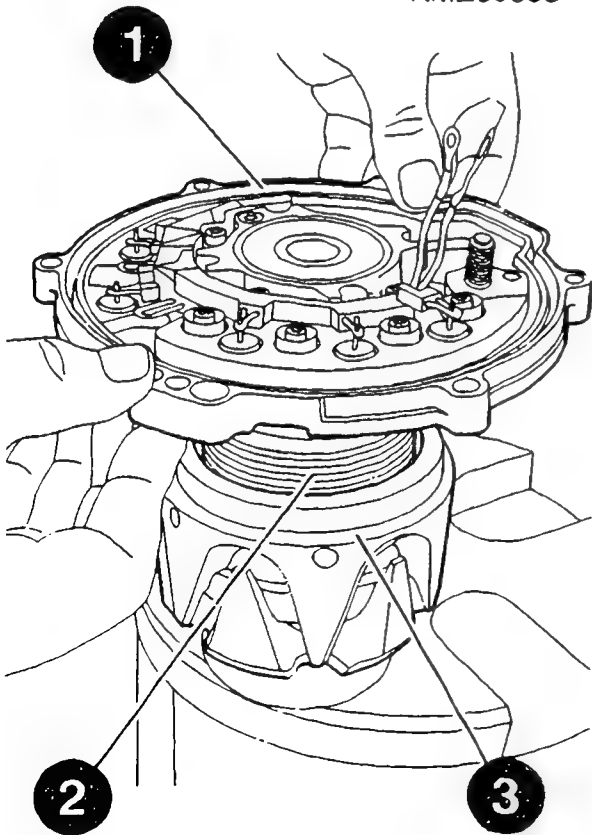
ASSEMBLING ALTERNATOR

Assembling windingless rotor

Mount drive-end shield (1) with pole body (2) on windingless rotor (3).

Continue: III18/1 Fig.: III17/2

KME00659



ASSEMBLING ALTERNATOR

Assembling windingless rotor

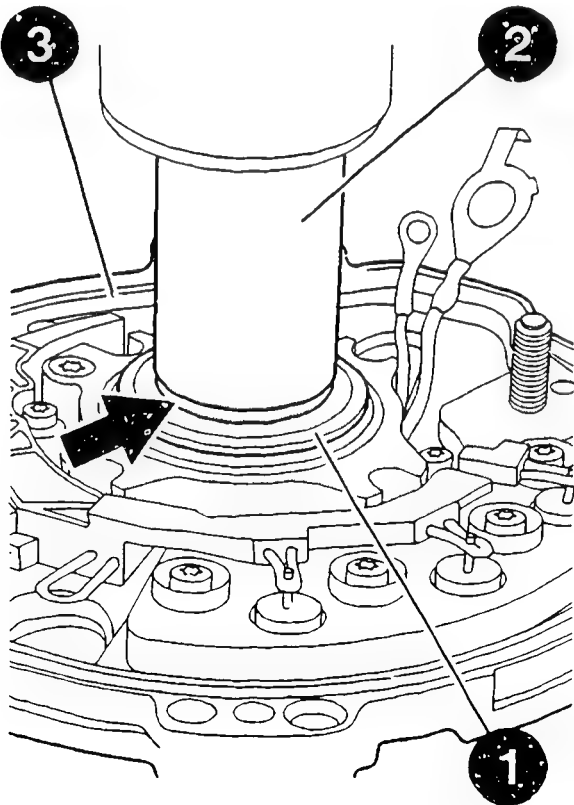
Slip spacer (1) onto rotor shaft.

NOTE:

Collar with larger spacer diameter
(see arrow) must face upwards.

Continue: III19/1 Fig.: III18/2

KME00660



ASSEMBLING ALTERNATOR

Assembling windingless rotor

Use pressing-on sleeve (2) to press home spacer (1) and drive-end shield (3) on windingless rotor shaft. Position assembly on a clean flat surface.

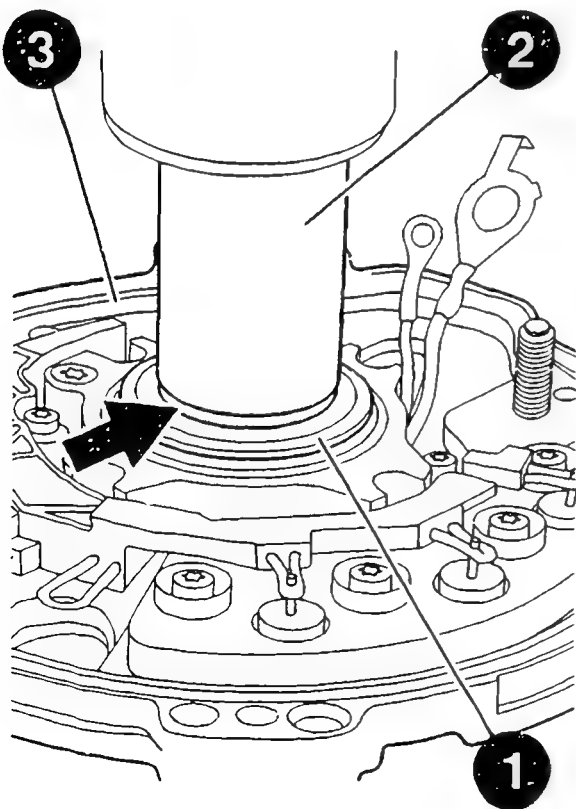
ATTENTION: DANGER OF INJURY

Make sure windingless rotor does not become inadvertently detached from drive-end shield.

Pressing-on sleeve: to be improvised

Continue: III13/1 Fig.: III19/2

KME00660



ASSEMBLING ALTERNATOR

Assembling drive-end shield

Use plastic spatula to apply thin coat of thermal conduction paste to contact surface (1) at housing (2).

ATTENTION:

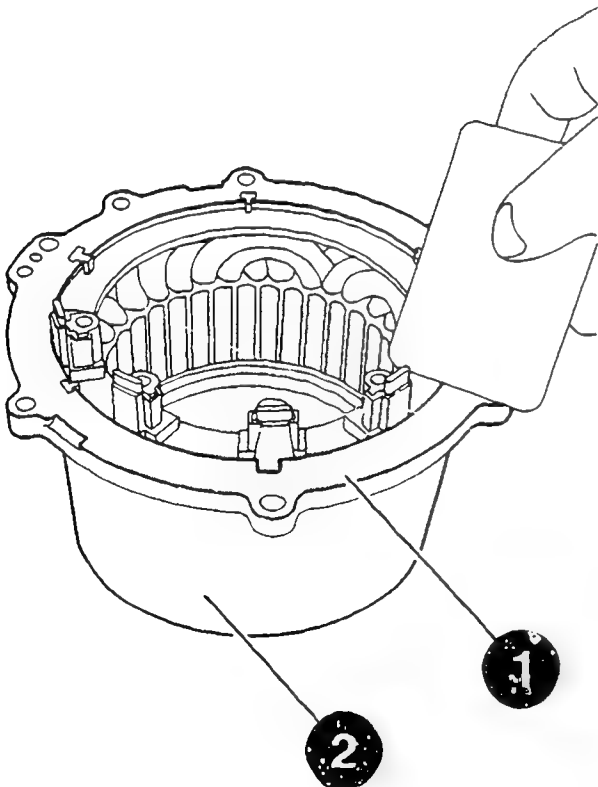
Thermal conduction paste must form a continuous layer. If position is corrected, make sure contact surface at housing is completely coated with thermal conduction paste.

Thermal conduction paste
VS 11894-CH:

5 942 860 000

Continue: III21/1 Fig.: III20/2

KME00526



ASSEMBLING ALTERNATOR

Assembling drive-end shield

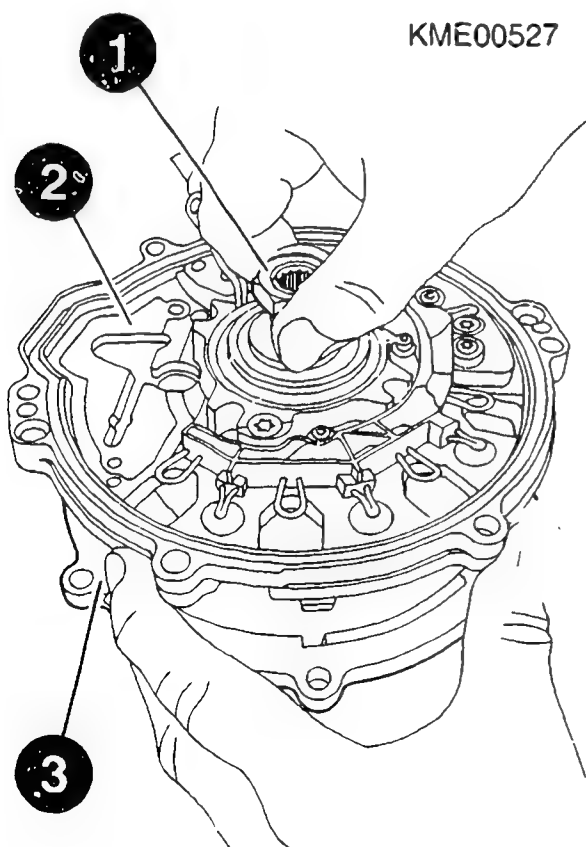
Screw nut (1) of pulley onto rotor shaft.

Insert pre-assembled unit (2) in housing (3). Take care not to damage stator. Pay attention to position of stator winding connections. Screw off pulley nut.

ATTENTION: DANGER OF INJURY

Make sure windingless rotor does not become inadvertently detached from drive-end shield.

Continue: III22/1 Fig.: III21/2



ASSEMBLING ALTERNATOR

Assembling drive-end shield

Secure drive-end shield (1) with housing connecting bolts (2).
Fasten the 3 studs of the phase contacts (3).
Use torque wrench.

Tightening torques

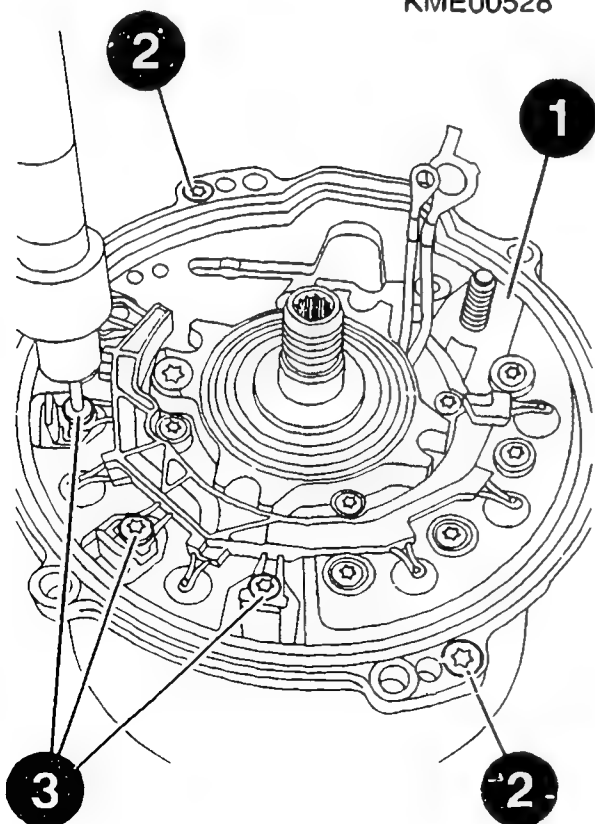
Housing attachment:	2,3...2,7 Nm
Phase contacts:	1,0...1,4 Nm

Torque wrench:

TORX T20:	comm. avail.
TORX T25:	comm. avail.

Continue: III13/1 Fig.: III22/2

KME00528

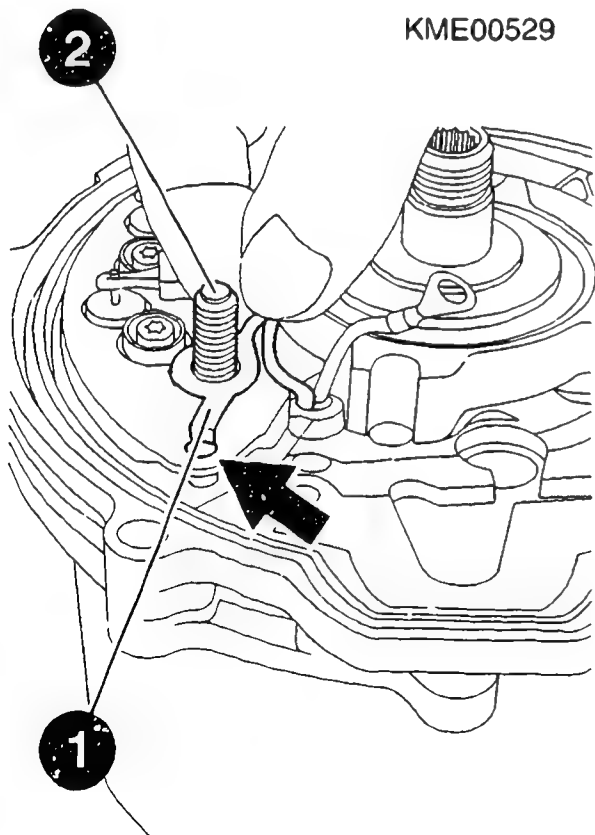


ASSEMBLING ALTERNATOR

Assembling regulator

Slip eyelet of pole body (1) onto terminal stud B+ (2).
Pay attention to correct positioning of locking element (see arrow) in drive-end shield hole.

Continue: III24/1 Fig.: III23/2



ASSEMBLING ALTERNATOR

Assembling regulator

Mount regulator (1) and secure with 2 bolts (2) and (3).

ATTENTION:

Start by tightening bolt (2) to prescribed torque.

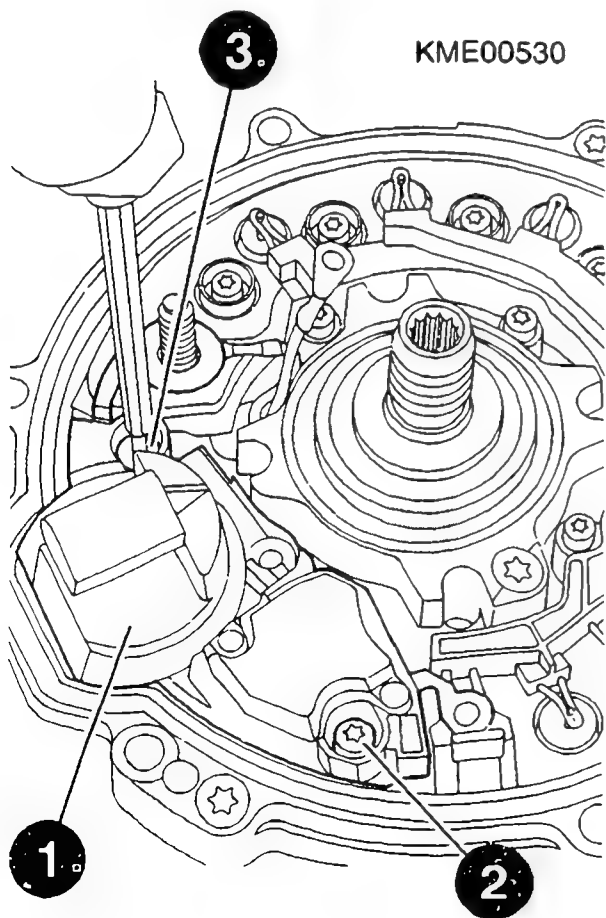
Use torque wrench.

Tightening torque: 1,0...1,4 Nm

Torque wrench: comm. avail.
TORX T20: cmm. avail.

Continue: III25/1 Fig.: III24/2

KME00530



ASSEMBLING ALTERNATOR

Assembling regulator

Fasten connection/terminal V (1).
Use torque wrench.

Tightening torque
Terminal V:

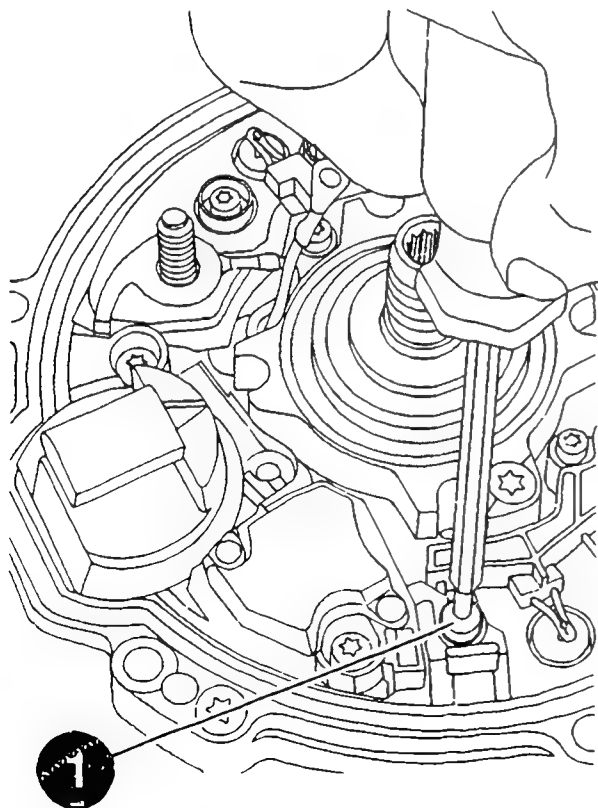
1,0...1,4 Nm

Torque wrench:
TORX T20:

comm. avail.
comm. avail.

Continue: III26/1 Fig.: III25/2

KME00531



ASSEMBLING ALTERNATOR

Assembling regulator

Attach DF connection (1) to regulator.

Use torque wrench.

NOTE:

Cable lug must be completely in recess of regulator (see arrow) to enable adhesive ring to be fitted.

Tightening torque

DF connection:

1,0...1,4 Nm

Torque wrench:

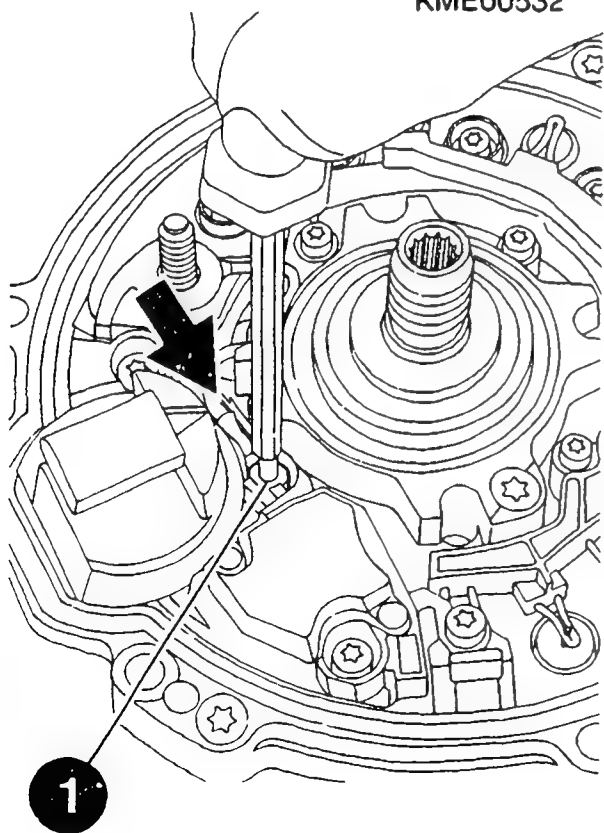
comm. avail.

TORX T20:

comm. avail.

Continue: III13/1 Fig.: III26/2

KME00532



ASSEMBLING ALTERNATOR

Fitting adhesive ring at regulator

NOTE:

This work need not be performed on fitting a new regulator (adhesive ring already fitted).

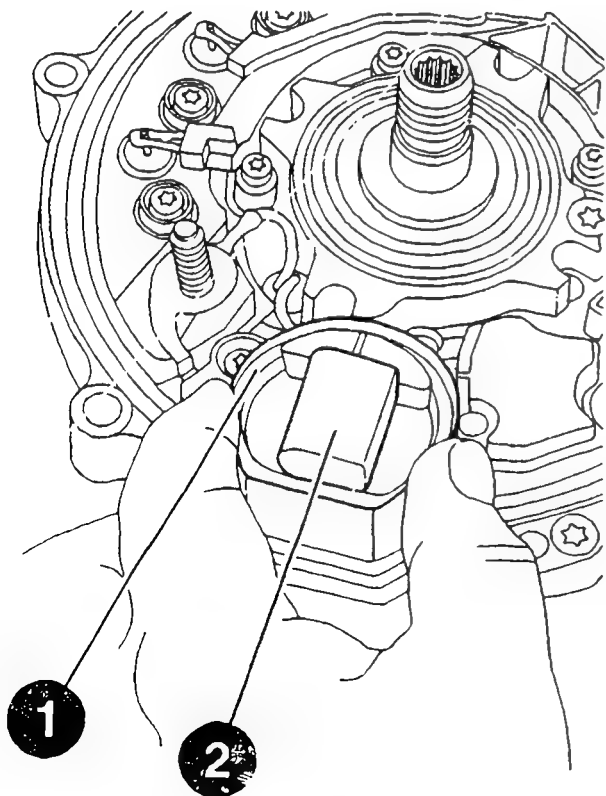
Carefully slip new adhesive ring (1) onto regulator (2).

NOTE:

Pay attention to correct positioning of adhesive ring and cable lug.

Continue: III13/1 Fig.: III27/2

KME00533



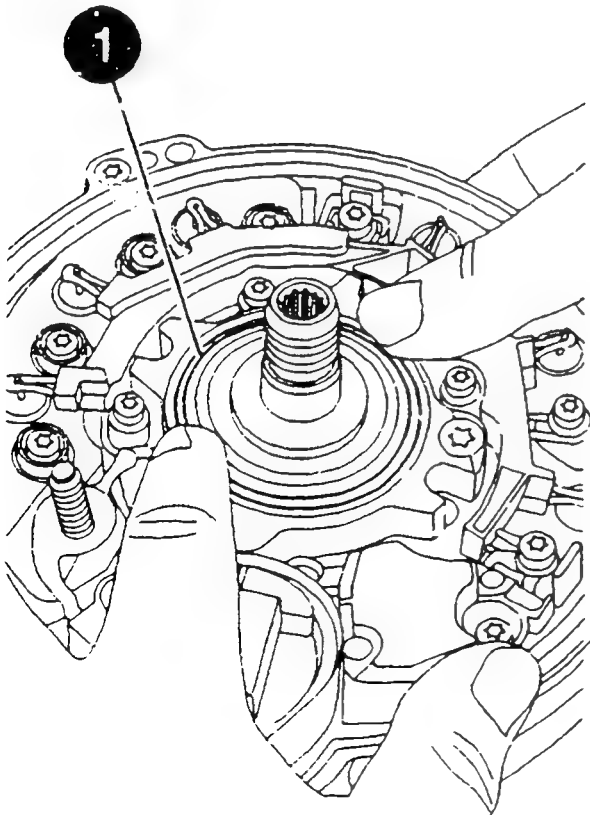
ASSEMBLING ALTERNATOR

Fitting cap

Insert new O-ring (1) in annular groove of drive-end shield.

Continue: IV01/1 Fig.: III28/2

KME00534



ASSEMBLING ALTERNATOR

Fitting cap

Mount new cap (1).

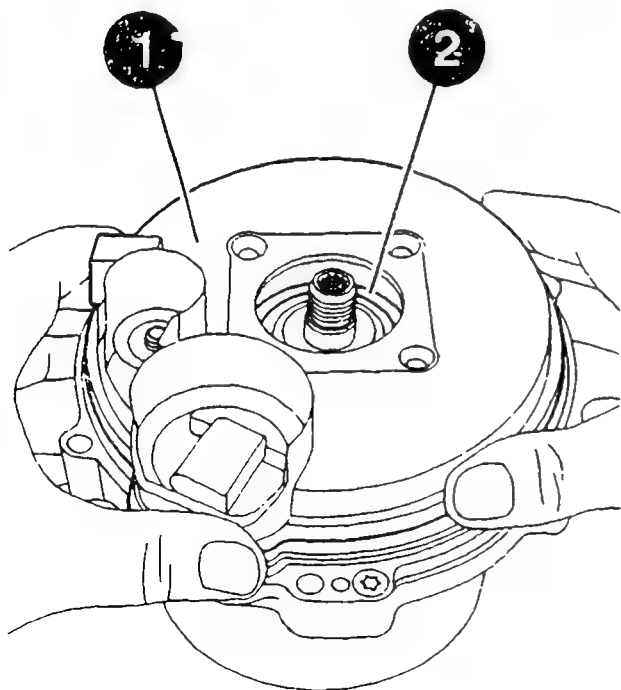
ATTENTION:

Position of O-ring (2) is not to be altered.

Correct if necessary.

Continue: IV02/1 Fig.: IV01/2

KME00535



ASSEMBLING ALTERNATOR

Fitting cap

Secure new cap (1) with new bolts (2).
Fasten connection/terminal B+ (3).
Use new nut.

Use torque wrench.

Tightening torques

Ball-bearing retaining
plate:

7,0...7,6 Nm

Terminal B+:

18...22 Nm

Torque wrench:

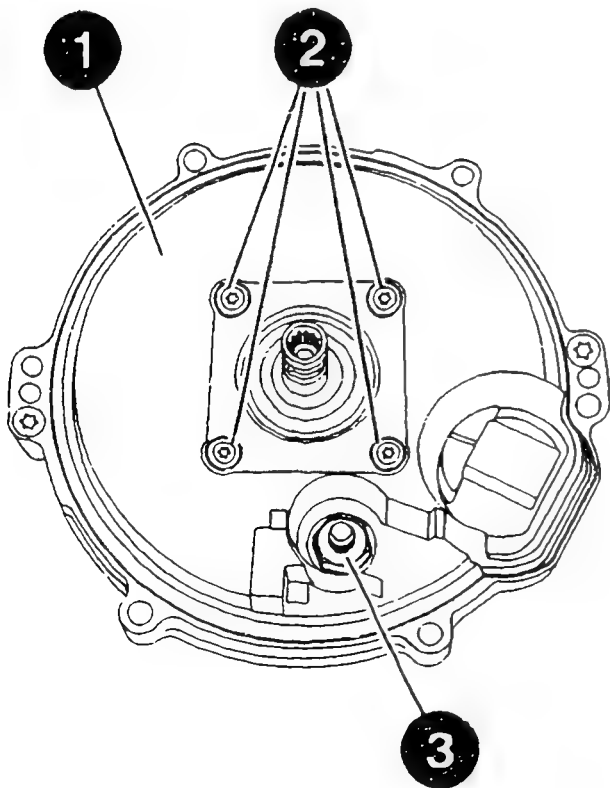
comm. avail.

Torx T25:

comm. avail.

Continue: III13/1 Fig.: IV02/2

KME00536



ASSEMBLING ALTERNATOR

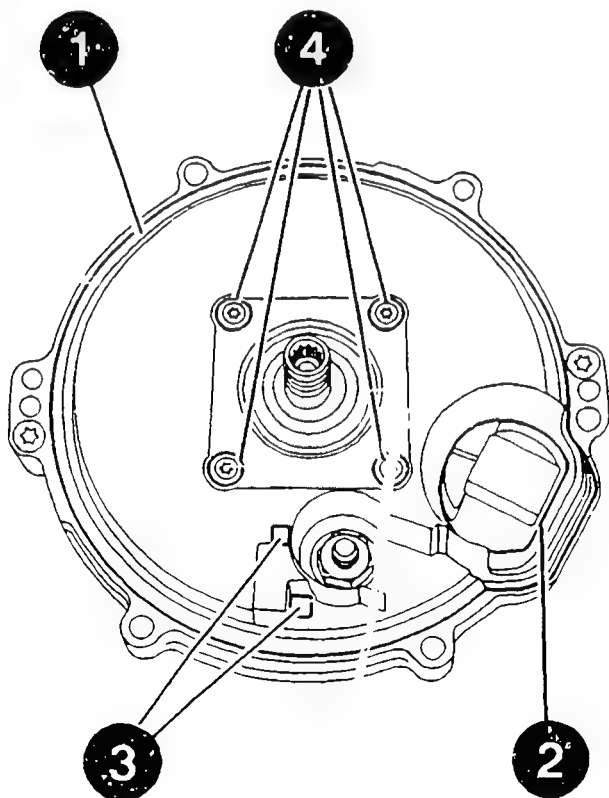
Sealing alternator

The following locations must be sealed with adhesive:

- Groove of cap at OD (1);
- Groove of adhesive ring (2);
- 2 openings in cap (3);
- Bolts of cap (4);

Continue: IV04/1 Fig.: IV03/2

KME00537



ASSEMBLING ALTERNATOR

Sealing alternator

Seal alternator at locations indicated.

Allow adhesive to run evenly into the grooves until the contact surfaces are properly covered.

ATTENTION:

Following sealing allow adhesive to cure for 48 hours.

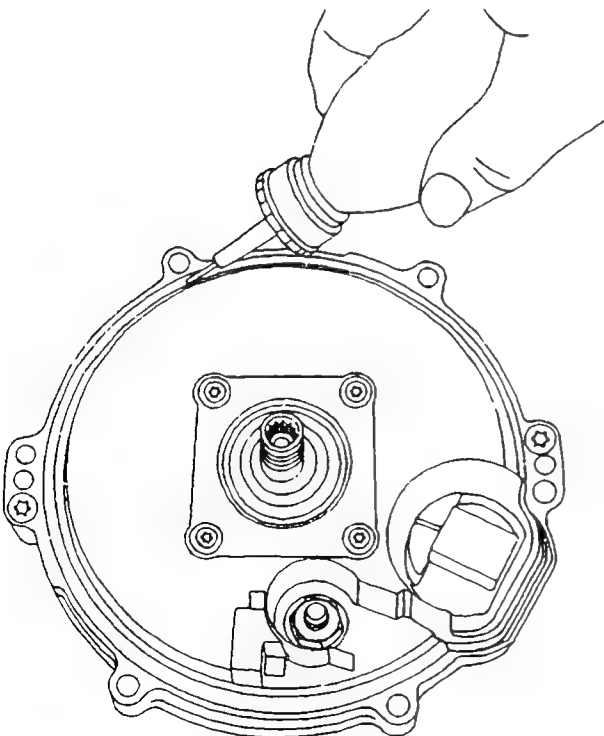
Adhesive

VS 18295-KK:

5 997 753 000

Continue: III13/1 Fig.: IV04/2

KME00538



ASSEMBLING ALTERNATOR

Assembling pulley

Attach pulley (1) and spring lock washer, screw on nut.

Tighten nut whilst supporting windingless rotor.

Use torque wrench.

Tightening torque: 60....70 Nm

Torque wrench: comm. avail.

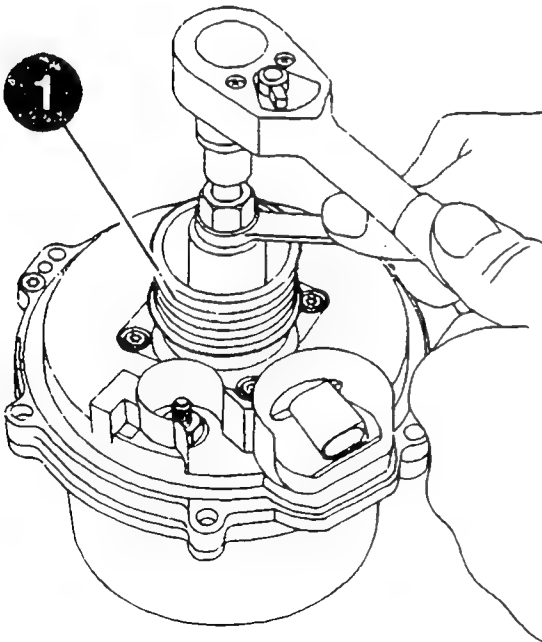
Socket wrench: 0 986 618 152

Multi-point socket M10

Long version: comm. avail.

Continue: IV06/1 Fig.: IV05/2

KME00540



ASSEMBLING ALTERNATOR

Assembling pulley
(overrunning-clutch pulley)

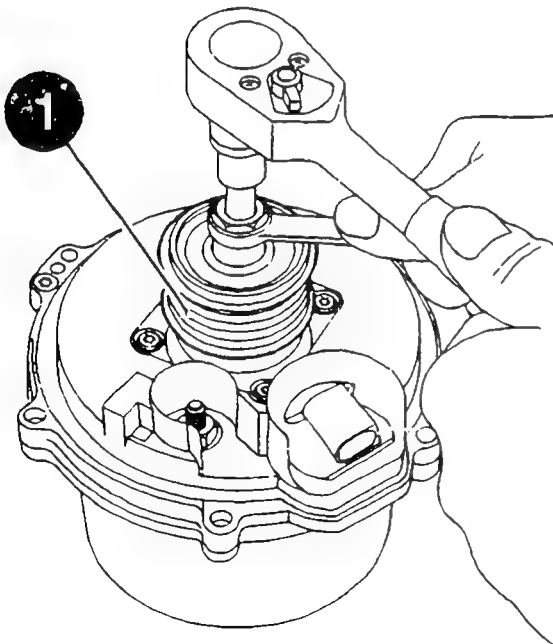
Screw overrunning-clutch pulley (1)
onto rotor shaft and tighten by way
of dismantling tool whilst supporting
windingless rotor.
Use torque wrench.

Tightening torque: 75...85 Nm

Torque wrench: comm. avail.
Dismantling tool: 0 986 319 396
Multi-point socket M10
Long version: comm. avail.

Continue: IV07/1 Fig.: IV06/2

KME00541



ASSEMBLING ALTERNATOR

Assembling pulley

Pulley cap is always to be renewed.

Cap is either inserted or clipped on.

Continue: III13/1

ASSEMBLING ALTERNATOR

Replacing sealing ring

Remove old sealing ring.

Clean groove (1) at housing.

Absolute cleanliness of the groove is essential to ensure proper functioning of the sealing ring.

Insert new sealing ring (2) in groove.

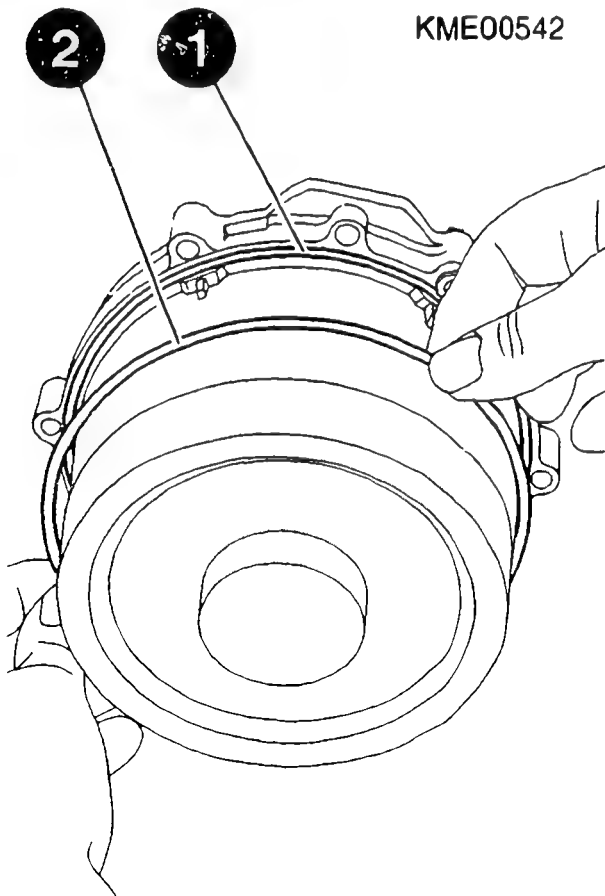
Check correct fit.

ATTENTION:

Sealing ring must not be twisted when fitted.

Continue: III13/1 Fig.: IV08/2

KME00542



ASSEMBLING ALTERNATOR

Alternator leak test

Parts required

- * 6 x hexagon bolt M6x35
DIN 933-8.8: comm. avail.
- * 12 x washer
DIN 125-A 6.4: comm. avail.
- * 6 x hexagon nut M6
DIN 934-8: comm. avail.
- * 1 x B+ connecting cable
nut: vehicle-specific

Continue: IV09/2

ASSEMBLING ALTERNATOR

Alternator leak test

Parts required

- Test adapter: 0 986 619 419
- Vacuum pump: comm. avail.

Continue: IV10/1

ASSEMBLING ALTERNATOR

Alternator leak test

Fit housing bolts (1).

ATTENTION:

Position washers under both bolt head and hexagon nut.

Use torque wrench.

Tightening torque:

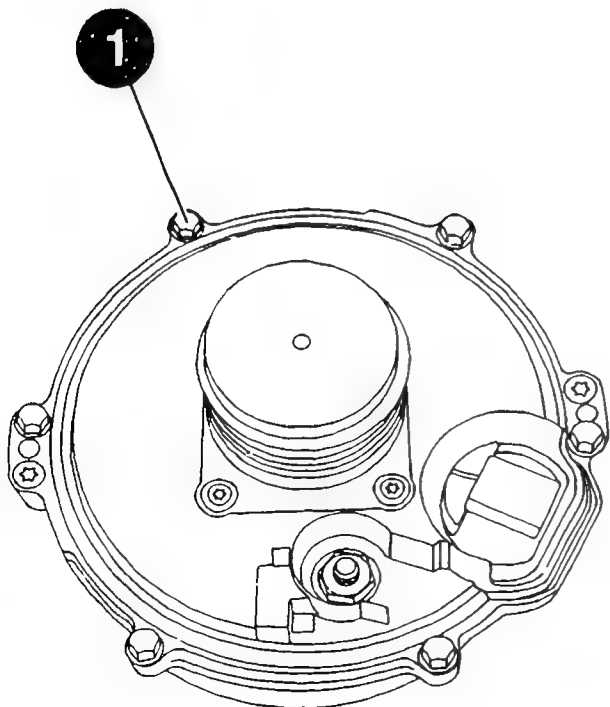
10 Nm

Torque wrench:

comm. avail.

Continue: IV11/1 Fig.: IV10/2

KME00543



ASSEMBLING ALTERNATOR

Alternator leak test

Fit nut (1) of B+ connecting cable
(Boellhoff nut).

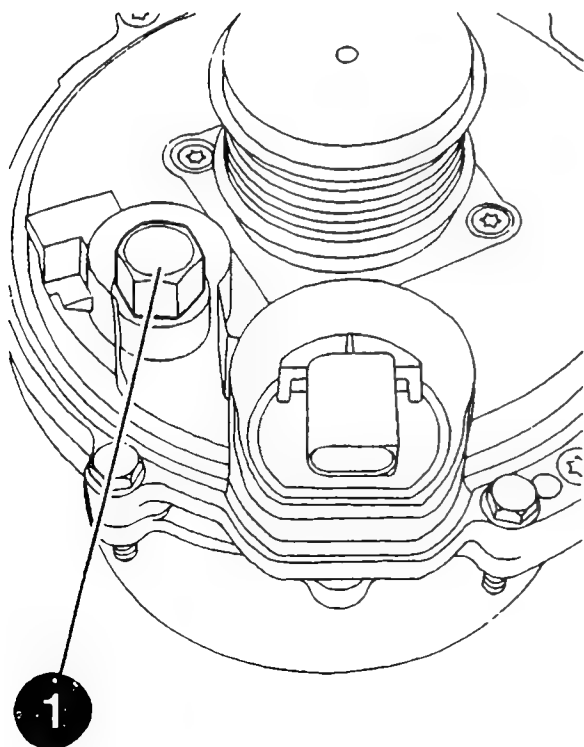
Use torque wrench.

Tightening torque: 10,1...13,5 Nm

Torque wrench: comm. avail.

Continue: IV12/1 Fig.: IV11/2

KME00544



ASSEMBLING ALTERNATOR

Alternator leak test

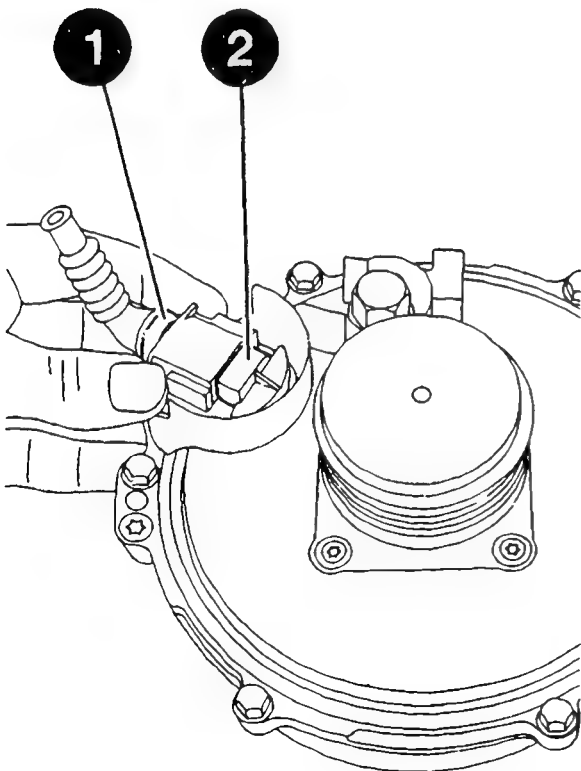
Attach test adapter (1) to regulator connection (2).

Test adapter:

0 986 619 419

Continue: IV13/1 Fig.: IV12/2

KME00545



ASSEMBLING ALTERNATOR

Alternator leak test

Set down alternator as horizontally as possible on a flat surface (similar to installation position in vehicle).

Connect vacuum pump (1) to test adapter (2).

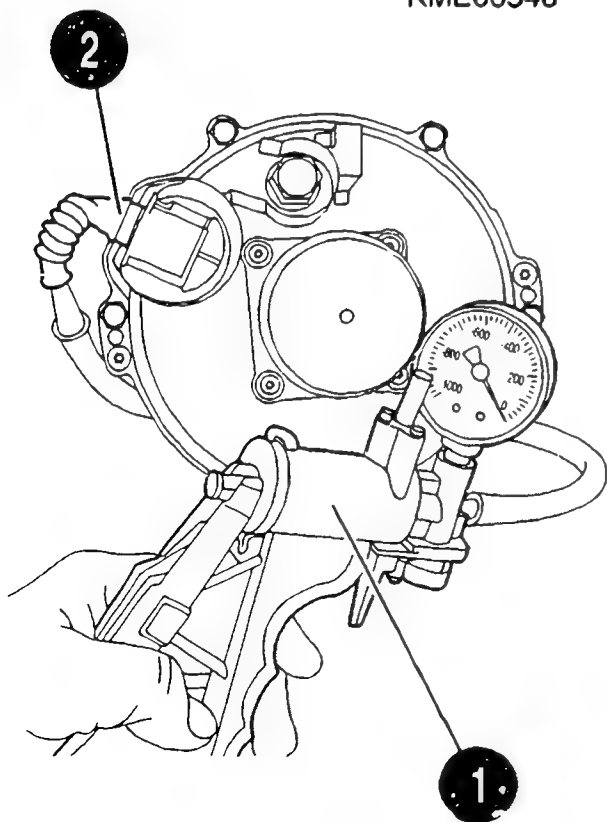
Generate vacuum of 100 mbar.

SET VALUE: Vacuum may decrease at most to 90 mbar within 15 s.

Vacuum pump: comm. avail.

Continue: IV14/1 Fig.: IV13/2

KME00546



ASSEMBLING ALTERNATOR

Alternator leak test

Proceed as follows if set value is not attained:

- Assemble alternator on test bench
- Connect battery to alternator
- Run up alternator within 30s to rated speed (6000 1/min)
- Perform leak test again

ATTENTION: Heed notes.

Continue: IV14/2

ALTERNATOR LEAK TEST

NOTES:

- Alternator pulley is not to be used as "carrying handle" (possibility of DE ball bearing damage).
- Alternator is not to be operated for more than 30 s without water cooling. Cooling-down time of 2 hours must be allowed prior to renewed loading.
- Alternator is not to be operated without battery.

Continue: IV15/1

ASSEMBLING ALTERNATOR

Alternator leak test

If set value is still not attained after running up alternator on test bench, positive pressure test must be performed to locate leak.

Use suitable pump to generate pressure of 100 mbar in alternator by way of test adapter.

Pump: comm. avail.

Continue: IV15/2

ASSEMBLING ALTERNATOR

Alternator leak test

Completely immerse alternator in a vessel filled with water.

ATTENTION: There must always be positive pressure in the alternator to stop water ingressing.

The leak can be clearly seen from the concentration of rising bubbles.

NOTE:

Single bubbles rising at lengthy intervals have no significance as regards alternator leakage.

Continue: IV16/1

ASSEMBLING ALTERNATOR

Alternator leak test

Re-seal alternator at leakage point.

Possible leakage
points

Remedy

- Deep-groove ball bearing
in drive-end shield:

Replace

- O-ring
in drive-end shield:

Replace

Continue: IV16/2

ASSEMBLING ALTERNATOR

Possible leakage
points

Remedy

- Housing/drive-end
shield sealing surface:

Apply
thermal
conduction
paste as
specified

- Transition between
ball-bearing retaining
plate and cap
(plastic):

Replace
cap

Continue: III13/1

EDITORIAL NOTE

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Continue: IV17/2

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Continue: I01/1